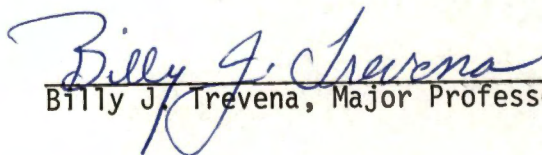
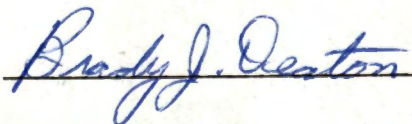


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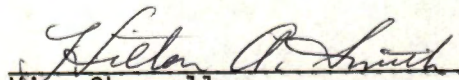
I am submitting herewith a thesis written by William T. Coyle entitled "Farmland Consolidation and Fragmentation in Upper East Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.


Billy J. Trevena, Major Professor

We have read this thesis and
recommend its acceptance:




Accepted for the Council;


Vice Chancellor
Graduate Studies and Research

Ag-VetMed

Thesis

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FARMLAND CONSOLIDATION AND FRAGMENTATION
IN UPPER EAST TENNESSEE

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

William T. Coyle

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7

ABSTRACT

Forty percent of farm operators in the 12-county Upper East Tennessee region have expanded their farmland base at one time or another. Consolidation of small farm units into larger ones has been an important adjustment strategy that the nation's farmers have used to maintain or improve their farm income. The gains from this strategy are not clear in Upper East Tennessee. In the region, those farmers who have expanded their land base own an average of 93 acres, more than twice the holdings of farmers who have not expanded. Nevertheless, 93 acres is substantially below the state average of more than 120 acres for all farms.

Although net and gross farm incomes generated on expanded farms were significantly higher than on the non expansion farms, the difference does not appear to be very important. In 1974, average gross farm income for the expansion group was \$7,354 while that for the non-expansion group was \$3,342. Neither income is representative of a very large operation.

In 1975, 25 percent of farm operators in the region expanded their land resources by renting in part of the land that they used. Another 4 percent were tenants who rented in all of the land that they farmed. This represents a continuing trend toward more rental and less ownership of farmland. Still, the majority of the region's farmers own all the land which they farm.

In most farm areas in the United States, the process of farmland consolidation has led to increases in the average farm size which is

characteristic of an area. The average farm size in Upper East Tennessee is presently about 60 acres and has not changed appreciably in the last 25 years. Increases in the number of small part-time and hobby farms have been off-set by decreases in the number of small full-time farms. Likewise the consolidation of medium sized farms into larger ones has been off-set by the processes of farm fragmentation.

Evidence from this study indicate that farmers in Upper East Tennessee have been unable to pursue successfully a strategy of farmland consolidation because land has been relatively scarce in both a physical and economic sense. The region is traversed by four mountain ranges and has proportionately less Class I-III land than the state as a whole. Furthermore, non farm growth in the region has been substantial. Population density and growth in land area devoted to urban and built-up uses are both above the state average. The price of farmland in the region has increased by a factor of five since the 1940's to a current average of \$718 per acre. Industrial and urban growth since the 1950's are responsible for this surge. Industry has not only affected farmland price by competing for it directly, but it has provided jobs for many of the farmers. Forty-nine percent of the region's farmers were employed full-time off the farm in 1975. Secure off-farm income has made the operator less dependent on farm income and more likely to view land as a speculative as well as a productive asset.

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CHAPTER I

INTRODUCTION, OBJECTIVES, AND PROCEDURE

I. INTRODUCTION

Low and declining farm incomes have been the principal reason why farmers have continually had to make adjustments to maintain and improve their economic position. Historically, adjustments have come through the adoption of new technologies. This provides a "windfall" to the first adopters but the benefits are soon shifted to the consumer in the form of lower prices as more and more farmers adopt the new technology. Low per unit returns necessitate the expansion of volume so as to obtain lower per unit costs. Greater volume of production implies more intensive practices on existing acreage, the expansion of acreage, or both. The national pattern shows that more intensive methods have been applied to larger and larger acreages.

Expanding acreage, or the consolidation of farmland into larger units has been prominent among the adjustment options open to the farmer. Roy (24) lists it as an important alternative to be considered by the limited resource farmer:

1. Upgrade the technology employed on the farm presently so that output per unit of input is increased.
2. Rent, lease or purchase more land to obtain economies of scale.
3. Leave the farm and migrate to urban areas or to better rural areas.
4. Obtain off-farm employment.
5. Shift farm enterprises from low return to higher return ones.
6. Apply for public assistance.

All but the last alternative are probably appropriate to any farmer regardless of his economic position.

The ability of a farmer to consolidate through purchase or lease of land is dependent on its physical as well as economic availability. If land is not available in parcels of the right size and quality to meet the objectives of the farmer, then consolidation through purchase or lease is not an option, at least in the short run. The aggregate supply of farmland in an area is the ultimate constraint on consolidation. According to some experts, agricultural land in the United States is currently not in short supply but could be if technology does not keep pace with demand for foodstuffs:

. . . the United States' land resource base appears ample for future domestic needs, at least beyond the year 2000. It also seems likely that United States farmers will have adequate land and technology to make sizeable commitments to the export market. But, it may not come easily; how well we do will depend on our chances for higher productivity per acre and our chances for more crop acres (7, p. 3).

Nationwide availability of farmland does not necessarily imply that it is physically or economically available in all regions of the country. There are areas of farmland surplus and deficit.

Farmland may be available physically but not in an economic sense. Competition for space is keen as population grows and urban areas sprawl. The farmer who lives in close proximity to urbanizing areas must compete with non-farmers for level, well drained and fertile lands. Ability to compete successfully not only with other farmers but with rural residents earning non-farm incomes, developers, and industrial interests becomes critical to the farmer's ability to consolidate his land base. Success or failure in consolidation is a function of the farmer's relative bargaining position in the real estate market.

Patterns of farmland consolidation differ throughout the country because the relative bargaining position of the farm sector and other sectors in a particular real estate market differ at least in degree. For example, a pattern of widespread consolidation of farm units reflects the profitability of farming with the expected annual returns from agricultural use justifying the purchase price of land.

In some areas farmland prices may have risen so high that the use of land in agriculture is no longer rational. This is often the case at the so-called rural-urban fringe when the return on land used for non-farm purposes is greater than in agriculture. Farmland is idled and shifted to "higher and better uses" over time. If a farmer did in fact expand his land base in an area like this, his motive would more than likely be speculative rather than to increase farm income.

Summarily, farmland consolidation has been a prominent characteristic of American agriculture. At the micro level, it represents an important adjustment an individual farmer can make to maintain or improve his farm income. The feasibility of this kind of adjustment has an influence on the farmer's ability to choose among alternatives. At the broader macro level, the pattern of farmland expansion and fragmentation is reflective of the general status of agriculture in a particular region:

Changes in the market value and rate of transfer of farm real estate, which represents three fourths of all physical assets in agriculture, are a barometer (*italics mine*) of the economic position of agriculture (11, p. 198).

Farm growth and viability is often reflected by the way farmland is used, consolidated, and broken up in an area. Such information on farmland is helpful in sensitizing the public-at-large as well as policy makers to the conditions of the agriculture sector. This sector, although small

in numbers, owns and controls a significant portion of the land resources in most areas. The manner in which government policy affects this population through either action or inaction has important implications for the way a region's land will be used in years to come.

II. OBJECTIVES

The overall objective of this study is to develop a profile of the farmland in the twelve-county region of Upper East Tennessee¹-how it is being acquired, used and distributed among farmers in the region. More specific objectives in this descriptive study are:

1. To describe the pattern of farmland use and shifts in use within the economic milieu of the region; to focus on characteristics of a region which are associated with the price of farmland, the mechanism by which it is allocated among competing interests.
2. To describe the current farmland tenure pattern in the region.
3. To describe the historical pattern of farmland consolidation and fragmentation in the region.
4. To describe the effects of location on the pattern of farmland consolidation and fragmentation that have occurred over time.

III. PROCEDURE

The first objective of the study was met with the use of secondary data from a variety of sources such as the Census of Agriculture, The

¹"Upper East Tennessee" refers to a functional economic area described by Charles Kerley in his dissertation, A Delineation of Functional Economic Areas in the Tennessee Valley. The region includes the following twelve counties: Carter, Cocke, Grainger, Greene, Hamblen,

Conservation Needs Inventory, and Soil Surveys of the different counties in the region. Pearson correlation coefficients were used to investigate the extent to which different land uses and other key characteristics of a county were associated with the average farm real estate value in the county. Time series data was also used to gain insight into the kinds of shifts in land use that have taken place with the passage of time.

The second, third, and fourth objectives were accomplished by utilizing data from a questionnaire administered to a random area sample of farm² operators in the twelve-county region. The sampling procedure involved the following:

1. The region was divided into areas demarcated by some natural or man-made boundary, i.e. rivers, creeks, roads, etc., when possible.
2. The size of the areas was adjusted according to the known population of farmers in a county as estimated by the 1969 Census of Agriculture. Counties with larger numbers of farmers were divided into smaller areas while counties with a smaller number were divided into relatively larger areas.
3. Areas that were clearly urban or built-up were not included.
4. Forty areas were drawn from the total number of possible areas.
5. Two hundred eighty-seven farmers were finally interviewed.

Hancock, Hawkins, Jefferson, Johnson, Sullivan, Unicoi, and Washington counties. The area is considered relatively homogeneous in an economic sense based on various criteria including newspaper circulation, driving time, and commuter patterns.

²A "farm" was defined as that which had 10 acres of land or more and grossed at least \$50 or had less than 10 acres and grossed more than \$250 in 1974.

The second objective was met by using questionnaire data relating to a farmer's land holdings as of the summer of 1975. Farmers were divided into four tenure categories according to the manner in which each held his land resource. These were full-owner operators, part-owner operators, full-owner operator-landlords, and tenants. Descriptive information such as size of landholdings, income, and days worked off the farm was used to characterize differences and similarities among these tenure categories.

The third objective was met by using the survey data. Descriptive information on the process of consolidation of farmland was based on longitudinal data indicating the date, size, price and other descriptive characteristics of a farmer's initial acquisition as well as subsequent acquisitions of farmland. Longitudinal data on the sale of land were similarly analyzed. Information on the renting in and renting out of land was descriptive only of the year 1975. It was deemed impractical to gather this kind of information over a longer period of time because a farmer's leasing arrangements were apt to be quite variable from year to year. The variation would require more in-depth documentation than we were able to do on such a large sample with limited resources.

The final objective was met again by the use of the consolidation and fragmentation information gathered in the survey. To develop an understanding of the effect of location on these two processes, each sample area was classified according to its distance from one or more population centers in the region. Each area was scored according to the number of miles measured from the middle of the sample area to the middle

of the population center. A weighting procedure was used to account for the variation in sizes of population. This methodology is described more fully in Chapter V.



CHAPTER II

THE PHYSICAL AND ECONOMIC AVAILABILITY OF FARMLAND IN UPPER EAST TENNESSEE

Consolidation and fragmentation of farmland result from temporal processes in which a farmer adds or subtracts land to an already existing land base. As processes, they reflect the interests and motives of the individual farmer in his effort to accomplish certain goals over time. For instance, consolidation of farmland may reflect a desire to expand one's operation possibly to achieve economies of scale or perhaps to speculate on rising land values. Fragmentation, that is the sale of part of one's farmland, may reflect a desire to convert real estate to cash for retirement or other purposes. Whatever the motives are, the processes of consolidation and fragmentation are circumscribed by the physical as well as the economic context of the region in which they occur.

As a prelude to an analysis of farmland consolidation and fragmentation in the Upper East Tennessee region, we shall first examine the context in which the processes occur. The physical and economic availability of farmland in the region will be the subject of this chapter.

I. PHYSICAL CONSIDERATIONS

Topographic Features

From high points, its surface presents the appearance of an extended and congealed billowy sea, the great wave of which succeed each other in parallel lines (15, p. 529).

The aptness of this century old description is apparent only after studying

the topography of Upper East Tennessee. There are four parallel mountain ranges that traverse the area in a southwest to northeast direction. The largest and most dominant of these ranges are the Unaka Mountains, which run along the southeastern border separating the region from North Carolina. The mountains have a major influence on Johnson, Carter, Unicoi and Cocke counties and a lesser impact on Washington and Greene counties (see Figure 1). There is no question that this mountain range has affected the productive capacity of the counties that it touches both agriculturally and otherwise over the years. One hundred years ago it was indicated that the:

. . . southern side (of Cocke County) . . . is densely packed with ridges and spurs of the mountain (Unaka Mountains). On this account, more perhaps than from any other cause, the county is not thickly settled, and we suppose, never will be (15, p. 486).

Indeed even today Cocke County is among the most sparsely populated in the region with only 60 people per square mile in 1970. This is well below the average of 115 people per square mile for the region and 95 people per square mile for the state as a whole (34). In addition, the four counties influenced most severely by the Unaka range were in the lower half of counties in the region with respect to the total market value of their agricultural product in 1969 (33).

Bays Mountain is another important topographic feature that splits the region in half. It forms a wall separating Hawkins and Hamblen counties on its north side from Greene, Washington and Sullivan counties on the south. The mountain stretches from the middle of Jefferson County and traverses the region in a northeasterly direction to Kingsport near the Virginia border.

The Clinch and Powell mountains parallel Bays Mountain farther to



Figure 1. Regions of East Tennessee.

the north. Clinch Mountain forms the border between Hawkins and Hancock counties and splits Grainger County in half. Powell Mountain divides Hancock County in half.

There are four man-made lakes in the 12-county region. They occupy approximately 74,700 acres, 2.9 percent of the surface area in the region. South Holston and Watauga lakes occupy portions of Sullivan, Johnson and Carter counties in the extreme easternmost part of the region. Cherokee and Douglas lakes occupy portions of Grainger, Hamblen and Jefferson counties in the westernmost part of the region.

Within the region is a complicated network of creeks and rivers whose waters cut through the mountains forming gaps and hollows as they seek lower ground. The most important river is the Holston that winds through Sullivan and Hawkins counties and forms the Cherokee Lake in Grainger and Hamblen counties. The Clinch River courses through Hancock County, forming a valley between the Powell and Clinch mountains. In the southern part of the region the Nolichucky and the French Broad rivers are of considerable importance to Jefferson, Cocke, Greene, and Washington counties.

Soil Types in the Region

The delicate mantle of organic matter and other materials that make up the soil is of undisputed value to the farmer and to the agricultural productivity of a region. Because of the broken and varied topography of the Upper East Tennessee region, there exist numerous types and phases of soil, each differing in its suitability for crops, grazing, forestry and wildlife.

The relationship between soil type and its agricultural productivity is not always clear. How a soil is finally used depends on a number of physical, economic, and institutional factors. The fact that good soil exists does not mean necessarily that it will be used in the most advantageous way agriculturally. An inventory of soil types does indicate, however, potential agricultural capacity, assuming that proper management practices take place.

In agricultural use, it is generally conceded that the soil type has, along with other factors, an important influence on the income-generating capacity of a farm:

Generally, the higher the land class, the higher the returns to all factors of farm production. Within a land class, if suitable for farming, levels of production, size of production unit and combination of enterprises can be determined and developed which will produce the best returns for the farms in that class (4, p. 47).

The Soil Conservation Service has classified the soils in all but three of the counties in the 12-county region. Surveys for Hancock, Hawkins and Unicoi counties are presently nearing completion. In addition and more recently, a stratified random sample of soil types was selected for each county in the state. The samples were originally chosen for the Conservation Needs Inventory completed in 1958-60. The same samples were used again in 1966-67 to update the original study. The sample areas represented approximately 2 percent of the total land area in each county (31, p. 119). In both the soil surveys and the Conservation Needs Inventory, the soils in a county were categorized in the following classes and sub-classes:

Class I: Soils of this class are easy to farm and have no more than slight limitations in use. They may be used for intensive cultivation without any special

measures to control excess water or erosion. They may be expected to produce high yields under normal good management. There are no subclasses to this class.

Class II: Soils of this class can be used for tilled crops and have only moderate conservation problems or limitations. There are three subclasses: erosion hazard, wetness and soil limitations in the root zone.

Class III: Soils that have one or more serious conservation problems when used for tilled crops. There are three subclasses similar to those in Class II.

Class IV: Soils that have very serious conservation problems when cultivated requiring very careful treatment and management. Soils are generally suited for pasture, orchards and woodland. There are three subclasses to this class.

Class V: Non-existent in Tennessee.

Class VI: Soils requiring permanent vegetation, usually long producing pasture and forage, and having only moderate conservation problems under such use. There are two subclasses: erosion hazard and soil limitation at the root zone.

Class VII: Soils generally suited to trees. The more favorable sites are suited to limited grazing. There are two subclasses like those in Class VI (31, pp. 126-127).

It is apparent from these classifications that Class I through Class III represent the better soils from the standpoint of agriculture. According to the Conservation Needs Inventory, 27 percent of inventory land³ in the Upper East Tennessee region is Class I-III, the remainder being Class IV-VIII (31). This compared with 44 percent of inventory land in the state that is Class I-III. According to individual soil surveys for counties, 33 percent of all land, including inventory as

³"Inventory acreage" is the area that remains after federal land, urban and built-up areas, and water areas are subtracted from the total land area of a county (31, p. 121).

well as noninventory acreage, is Class I-III (30). We can conclude, therefore, that approximately 30 percent of the land in the 12-county region is Class I-III soil. This is substantially below the estimate for the state as a whole. The better soils are not as prevalent in the Upper East Tennessee region as they are in the state as a whole.

II. ECONOMIC AVAILABILITY OF FARMLAND

Often of greater importance than the physical attributes of farmland in a region are factors and circumstances that affect its price, the mechanism by which it is allocated in a free market economy. Ability to pay the price becomes the key to how farmland is allocated among competing interests. Generally, those who expect the highest returns for its use are able to pay the highest price and, therefore, are in the best bargaining position in the real estate market:

In a market economy it would seem correct that any good should go to the highest bidder. In the case of land the highest bidder is always the urban developer (3, p. 39).

So the degree to which a region is populated and urbanized influences the kind of competition that exists for farmland in that region and, therefore, its price.

Urbanization in the Region

The 12-county region under study has undergone considerable growth in its nonfarm sector. Annual growth of per capita value added by manufacturing from the time of the Civil War to 1950 has averaged 6.9 percent per annum compared with 4.0 percent for the nation (10, p. 20). Since 1950, nonfarm income in the region has increased by 344 percent from \$270 million to \$1,200 million (35). This compares with an increase of

305 percent across the state from \$2.4 billion to \$9.7 billion. In 1950 the region's nonfarm income represented about 11.3 percent of the state's total nonfarm income. In 1970 the region's share increased slightly to 12.4 percent (35).

Growth in nonfarm income has coincided with population growth. The region registered an increase of 16.5 percent in population from 396,000 in 1960 to 462,000 in 1970. This compared with an increase of only 9.9 percent across the state from 3.57 million to 3.92 million for the same period (34). Population density in the region increased from 98 persons per square mile in 1960 to 115 in 1970. The state registered an increase from 86 persons per square mile to 95 in 1970 (34). The region is not only growing faster in population, but its population density is substantially greater. There are presently two counties in the region large enough to be considered SMSA⁴ counties by the Bureau of the Census.

The Declining Farm Sector

Where the urban sector seems to be making advances in terms of income and population, the farm sector is losing ground. For example, total farm income in the region has fallen more sharply than in the rest of the state. Between 1950 and 1970 it declined 13.6 percent from \$52 million to \$43 million. Across the state total farm income declined only 5.5 percent from \$338 million to \$319 million over the same period (35).

⁴A Standard Metropolitan Statistical Area (SMSA) is defined by the Bureau of the Census as "a county or group of counties containing at least one city (or twin cities) having a population of 50,000 or more plus adjacent counties which are metropolitan in character and are economically and socially integrated with the central city." In Upper East Tennessee, Hawkins and Sullivan counties are so classified.

Despite sharp declines in farm income, the region's farm population has declined less sharply than in the state. Between 1959 and 1969 the number of farmers in the region declined by 10 percent from 26,024 to 23,361. The state as a whole experienced a more severe decline of 23 percent from 157,695 to 121,361 over the same 10-year period. Although the region had only 10 percent of the state's farmland in 1969, it had 19 percent of the state's farm operators (33).

The higher concentration of farmers in the region is indicative of a smaller average farm size. In 1969 the average size of a farm in the region was 66 acres. This compared with an average farm size for the state of 124 acres, almost twice the regional average (33).

Growth in average farm size has characterized American agriculture for 20 years (Table 1). Although the rate of increase has slowed in recent years, Upper East Tennessee has been characterized by a much slower increase. For example, between 1964 and 1969 average farm size in the region increased by only .9 percent from 65.9 acres to 66.5 acres. This compared with a more dramatic increase across the state of 8.8 percent from 114.0 acres to 124.0 acres.

Along with the prevalence of small farm acreages in the region is the relatively slow decline in the number of Class 5 and 6 farms.⁵ These are marginal farms by census definition with gross farm incomes of less than \$5,000. Between 1964 and 1969 these types of farms declined by

⁵ Class 5 farms by census definition are those that had gross farm sales of between \$2,500 and \$4,999 in the census year. Class 6 farms "have a value of farm products sold of \$50 to \$2,499 and a farm operator under 65 years of age who did not work off the farm 100 days or more in the census year."

TABLE 1

AVERAGE FARM SIZE BY YEAR AND PERCENT CHANGE BY CENSUS PERIODS,
1950-69, UNITED STATES, TENNESSEE, AND UPPER EAST TENNESSEE
COMPARISONS

Year	United States		Tennessee		Upper East Tennessee	
	Acres	Percent Change	Acres	Percent Change	Acres	Percent Change
1950	216		80.0		57.2	
		+12.0		+8.6		+5
1954	242		86.9		57.5	
		+19.0		+17.4		+11.1
1959	288		102.0		63.9	
		+15.3		+11.8		+3.1
1964	332		114.0		65.9	
		+11.1		+8.8		+9
1969	369		124.0		66.5	
Percent change between 1950-69		+73.2		+55.0		+16.3

Source: 1969 Census of Agriculture.

21.7 percent in the region. This compared with similar declines of 28.3 percent in the state and 25.8 percent in the nation. Considering just the Class 6 farms, the number in the region declined by 29.4 percent and in the state by 39.9 percent for the same five-year period (Table 2).

Of particular interest in the region is the recent growth in the number of part-time farmers.⁶ This is consistent with the growth in the nonfarm sector and the relatively slow decline in the total number of farmers. Off-farm employment appears to have been an important way in which farmers have adjusted to declining farm income. Between 1964 and 1969 the number of part-time farmers in the region increased 21.5 percent while the number in the state increased by only 11.3 percent. The nation registered a decline of 10.1 percent during the same period (Table 2).

In summary, population density in the region is relatively high. This has resulted in part at least to increases in nonfarm activity. The farm population is declining as it is in the state and nation but at a slower rate. Average farm size is half that of the state and is increasing at a negligible rate. The concentration of Class 5 and 6 and part-time farms is higher in the region than in the state as a whole.

III. DETERMINANTS OF FARMLAND VALUE IN UPPER EAST TENNESSEE

The growth of the urban sector and the decline in farm income indicate, although not unequivocally, the probability of shifts in land use. Since farming is dependent on access to land, it is important to

⁶ A "part-time farm" by census definition is one that has "a value of farm products of \$50 to \$2,499 and a farm operator under 65 years of age who worked off the farm 100 days or more in the census year."

TABLE 2

PERCENT CHANGE IN NUMBER OF FARMS BY INCOME CLASS FOR UPPER EAST TENNESSEE AND TENNESSEE
DURING 1959-64, 1964-69 AND 1959-69 PERIODS

Income Class	Percent Change					
	1959-64		1964-69		1959-69	
	Upper East Tennessee	Tennessee	Upper East Tennessee	Tennessee	Upper East Tennessee	Tennessee
Class 1 - Sales of \$40,000 and over	+55.0	+98.3	+106.9	+63.0	+221.4	+223.3
Class 2 - Sales of \$20,000-\$39,999	+65.2	+61.1	+83.5	+45.1	+203.0	+113.7
Class 3 - Sales of \$10,000-\$19,999	+33.0	+14.7	-3.0	+4.3	+28.9	+19.6
Class 4 - Sales of \$5,000-\$9,999	+15.0	-6.7	+8.6	-3.7	+24.8	-10.1
Class 5 - Sales of \$2,500-\$4,999	-9.1	-22.4	-10.2	-14.2	-18.3	-33.5
Class 6 ^a	+6.3	-3.7	-29.4	-39.9	-25.0	-42.1
Part-time ^b	-25.4	-29.5	+21.5	+11.3	-9.4	-21.6
Part-retire ^c	-12.9	-12.3	-3.1	-15.2	-15.5	-25.6

^aFarms with a value of farm products sold of \$50 to \$2,499 and a farm operator under 65 years of age who did not work off the farm 100 days or more in the census year.

^bFarms with a value of farm products sold of \$50 to \$2,499 and a farm operator under 65 years of age who worked off the farm 100 days or more in the census year.

^cFarms with a value of farm products sold of \$50 to \$2,499 and an operator 65 years old or over.

Source: 1969 Census of Agriculture.

evaluate the effects of various land uses as well as other variables on the price of farmland, the mechanism which allocates its use.

What then are cross-sectional variables associated with higher or lower land values? Numerous variables have been previously hypothesized as having either a positive or negative relationship with the value of farmland. Tweeten (28, pp. 259-269) suggests that among these variables are net farm income, speculative value from population pressure, the number of nonfarm investors in the area, pressures for farm consolidation, farm programs such as tobacco allotments, excess labor in agriculture, and the changing financial structure in an area. Keller (13, p. 76) hypothesized an "aggregate price function for land" with the independent variables being net farm income, factor prices, technology, government programs and farm size and farm enlargement pressures. Pasour (21, pp. 551-552) and Mundy (18, pp. 1-2) used similar variables in their respective models to explain cross-sectional county by county variation in average farm real estate value. Their independent variables included effective property tax, percentage change in population, population per square mile, cropland as a percent of total farmland, average market value of crops and forestry products per acre of land, average size of farms and regional dummy variables.

In Mundy's model of Tennessee, population density alone explained 46 percent of the variation in 1969 average farm real estate values. After population density, cropland as a percentage of total farmland and average size of farms in a county entered the stepwise regression analysis. The three variables together explained approximately 80 percent of the variation in farm real estate value.

Since our analysis of Upper East Tennessee involves only 12 counties, multiple regression analysis was not appropriate because of a degrees of freedom problem. Instead, Pearson correlation coefficients between county and average farm real estate value were derived (Table 3). The variables chosen were hypothesized as being associated with farmland value in a county based on the results of previous research. The county by county variables chosen were percent of a county in various land uses (i.e. urban and built-up, cropland, pasture, etc.), percent of a county in burley tobacco production, population density, effective tax rate, average gross farm income per inventory acre, average farm size and percent of a county in Type I-III soils. There were seven significant correlations with average farm real estate value at the 95 percent confidence level: percent of a county in urban and built-up land, percent of a county in cropland, percent of a county in forestland, population density, average farm size, average gross farm income per inventory acre, and percent of a county in Type I-III soils. All were positive correlations except those with percent of the county in forestland and average farm size which were negative.

Urban and Built-Up Areas

The land in urban and built-up areas⁷ varies considerably from 1.8 percent of the land area of Hancock County to 16.6 percent of the land area of Sullivan County (31). There was a positive correlation

⁷"Land in urban and built-up areas" is defined as that area which includes "(a) cities, villages, and built-up areas of more than ten acres, (b) industrial sites, railroad yards, cemeteries, airports, golf courses, shooting ranges, etc., (c) institutional and public administration sites and similar types of areas" (31, p. 121).

TABLE 3

CORRELATIONS BETWEEN THE PERCENTAGE OF DIFFERENT LAND USES AND OTHER CHARACTERISTICS OF A COUNTY, TWELVE UPPER EAST TENNESSEE COUNTIES, 1969

	Feder- ally Owned Noncrop- land ^a	Urban and Built-up ^a	Crop- land ^a	Pasture	Forest	Inven- tory Land	Gross Farm Income Per Acre	Class I-III Soil	Popula- tion Density	Effec- tive Tax ^b	% of Farmland in Tobacco ^c	Average Farm Size ^d	Net Farm Income ^e	Average Value of Farm- land ^b
% federally owned	1.0000													
% noncrop land		-.2513	-.5220*	-.8380*	-.1738	-.9404*	-.4562	-.4220	-.0740	.0975	.3140	-.7430*	-.5823*	.1193
% urban and built-up		1.0000	.6378*	.4325	-.7394*	-.0924	.7040*	.7211*	.9403*	-.0655	.1398	-.2797	.1586	.8760*
% cropland			1.0000	.7907*	-.6858*	.3112	.7871*	.9239*	.5101*	.0630	.1326	.1155	.6643*	.5248*
% pasture				1.0000	.2921	.7039*	.7876*	.7712*	.2654	-.1014	.0806	.4320	.6587*	.1772
% forest					1.0000	.4383	-.6407*	-.7527*	.7174*	.0082	-.4542	.5520*	-.1836	-.8408*
% inventory land						1.0000	.2219	.1800	-.2536	-.0820	-.3713	.8597*	.5401*	-.4316
Gross farm income per inventory acre							1.0000	.8706*	.5930*	.0033	.3314	-.0137	.4685	.5796*
% of Type I-III soil								1.0000	.5835*	-.0292	.4389	-.0821	.6070*	.6139*
Population density									1.0000	-.0737	.0269	-.4186	-.1030	.8850*
Effective tax										1.0000	.0967	.0013	-.0957	-.0545
% of farmland in tobacco											1.0000	-.5041*	.2314	.2593
Average farm size												1.0000	.5528*	-.6212*
Net farm income per farm													1.0000	-.0655
Average value of farmland \$/acre														1.0000

*Significant at the 95 percent level.

^aSoil Conservation Service, Tennessee Soil and Water Conservation Needs Inventory, 1971.^bU. S. Department of Commerce, Census of Agriculture, 1969.^cU. S. Department of Commerce, Bureau of Economic Analysis, Personal Incomes by States Since 1929, for 1969.^dU. S. Department of Commerce, Census of Population, 1970.^eTennessee Taxpayers Association, The 1969 Annual Survey of County, City and Town Government in Tennessee, Nashville, Tennessee, 1970.

(.88) between the percent of a county in urban and built-up areas with the average value of farm real estate. Although this kind of land use physically occupies only 6.7 percent of the total area in the region, its impact on farmland value seems to be quite profound. The percent of a county in urban and built-up land is significantly correlated with population density (.94). Population density is likewise significantly correlated with average farmland value (.88). One would surmise that the impact of urban and built-up land area on farmland value is through population density. The effect of population density on farmland value has been substantiated repeatedly in previous research (18, 21). Furthermore, as previously indicated, there is a high concentration of part-time farmers because of the proliferation and growth of industries in the region.

It is reasonable to hypothesize that the concentration of part-time farmers with their off-farm sources of income contributes to the effective demand for farmland. Since they do not rely entirely on the income generating capacity of the land, they can afford to pay a higher per acre price than the full-time commercial farmer.

With development, an increasing proportion of the region's land resources will tend to flow to or remain in the hands of part-time farmers with stable, assured supplemental incomes. . . (5).

It has been further hypothesized that "East Tennessee"⁸ because of generally widespread nonfarm competition for agricultural land including a rather large recreational demand, was expected to have a higher real estate value than the other two regions of the state" (18, p. 5). The

⁸"East Tennessee" as defined by Mundy refers to a considerably larger area than that designated as "Upper East Tennessee" in this study.

results of regression analysis have shown that in 1969 "average farm real estate values were approximately \$48 higher in East Tennessee than values in Middle Tennessee" (18, p. 9).

Cropland

According to the Conservation Needs Inventory, 17 percent of the total land area in the region was classified as cropland.⁹ This compared with 26 percent for the state as a whole in the same year. Within the Upper East Tennessee region percentage of land area classified as cropland ranged from 8 percent in Unicoi County to 26 percent in Washington County. Percentage of cropland in a county was positively correlated with average farm real estate value (.52). This is apparently consistent with the theory of "highest and best use." Cropping is a relatively intense use of farmland, reflecting higher per acre returns than other more extensive uses. From the standpoint of opportunity costs, the full-time profit-maximizing farmer in light of rising farm real estate values generally must intensify his use of the land so as to get a return consistent with the value of his land resource (19). By discounting expected returns to land in a particular use over time, as well as psychic and speculative returns, one arrives at the present value of the property. If the market value exceeds the discounted value, it would be rational to sell the property at the going rate and invest the money elsewhere. The fact that the percent of cropland is positively associated with average farm real estate value indicates perhaps a certain "rational" behavior on

⁹"Cropland" has an extensive definition that can be found in the Tennessee Soil and Water Conservation Needs Inventory, 1967, p. 121.

the part of the region's farmers with respect to land use.

A more likely explanation, however, is the strong correlation between the percent of a county in urban and built-up land and the percent of a county in cropland (.64). The more suitable land for intensive kinds of agriculture, i.e., Class I-III soil types, is also the most attractive for industrial location and urban development (8, 29). It is apparent geographically that those counties with the greatest urban land use are those with the broadest expanses of level land. The great valley between the Unaka range and Bays Mountain encompasses almost the total land area of Sullivan, Greene, and Washington counties. These three counties are among the top four in the region with respect to percent of land in urban and built-up areas and percent of land in cropland.

Forestland

The largest single classification of land use is forestland, which occupies approximately 39 percent of the total land area in the region. This compares with 46 percent of the state's land area. The percent of forestland in a county ranges from 24 percent in Washington County to 66 percent in Hancock County. There is a strong negative correlation between the percent of forestland in a county and the average value of farm real estate (-.84). Since forestland is perhaps one of the least intensive uses of land, one would expect that a higher percent of forestland in a county would be associated with a lower average value of farm real estate. Forestland also tends to occupy land that is not very suitable for either agricultural or urban uses. For example, approximately 92 percent of the forestland in the region occupies the poorer Class IV-VI soil types.

Government Programs

It has been hypothesized by Tweeten (28), Schultze (25), and others that government agricultural programs designed to limit production have a positive effect on the value of farmland. In Upper East Tennessee, burley tobacco production is controlled by the government through a system of poundage allotments. This assures not only for the region but for all areas that grow burley that production will be within established limits and that price will be more stable over time. The effect of the production control is generally higher rates of return on burley tobacco production.

Of all crop activities described in the Tennessee Farm Planning Manual (23), burley tobacco has the highest per acre return, nearly \$1,488 to land, labor and management and \$876 to land and management. The return to land alone is difficult to estimate and is usually considered a residual after all labor, capital and management costs are subtracted out. That which is left accrues to the land and is usually called land rent. Land rent, when capitalized at a particular discount rate yields a present land value. The value of an acre of land in burley tobacco production assuming a constant land rent can, therefore, be calculated. The lease rate on tobacco quota is probably a reasonable estimate of the rent accruing to the land. Since the lease rate averaged \$.19 per pound in 1974 (16) and the average per acre yield was 2,184 pounds, then the average land rent can be calculated at approximately \$415. If we capitalize this rent into the land value by discounting the land rent by 5 percent and 10 percent, we get a present land value per acre of \$8,299 and \$4,150, respectively. Assuming continuity of the tobacco program, tobacco allotments add considerable value to an acre of land.

In Upper East Tennessee burley tobacco production is of considerable agricultural importance. In 1969, for example, burley receipts in the region represented 32 percent of the total value of agricultural products. This percentage has ranged up to as much as 48 percent in recent years depending on market conditions. Eighty-three percent of all farmers in the region reported burley tobacco production in 1969. The average tobacco acreage per farm was .92 acres and average production was 1,927 pounds. Only 1.1 percent of the total land in farms was planted in tobacco that year. So burley tobacco production is widespread, its contribution to the total value of agricultural production is considerable, and the amount of land used in its production is small.

According to correlations between the percent of farmland in a county devoted to tobacco production and average farm real estate value, there is not a significant relationship (.26). Apparently other more important determinants of farm real estate value overshadow the effects, if any, of the allotment system. Again, the high concentration of part-time farmers and nonfarm investors who rely on other than farm sources of income might not consider the tobacco allotment as very important, and, therefore, do not bid on its value.

Farm Size

As indicated before, the average farm size in the region is 66 acres, about half the state's average. Among the 12 counties in 1969, there was a significant negative correlation between average farm size and average farm real estate value (-.62). This is consistent with previous findings (18, 21). Since the value of the dwelling and capital improvements on a smaller farm are spread over fewer acres, it stands to

reason that a smaller farm will have a higher per acre value than a larger farm all other variables held constant. Furthermore, there is a stronger demand for the smaller units of land. Rural residents and part-time farmers are not as concerned with economies of scale with respect to size of landholding as are full-time commercial farmers.

It is also interesting to note that "the percent of a county in forestland" is positively correlated with farm size. Since forestland was also negatively correlated with average farm real estate value, it seems to follow that the larger farm units are in those counties not only with the relatively less expensive farmland but also those with larger expanses of forestland.

Federally Owned Land

The Upper East Tennessee region has a substantial amount of federally owned noncropland¹⁰ which occupies 13 percent of the region's land area. Across the state, only 5 percent of the land area is similarly classified. Within the region, there is considerable variation among the counties in the percent of their land area classified as federal noncropland. Hancock County has no land in this category while Unicoi County has 44 percent of its land federally owned. Other counties with more than 20 percent of their land areas federally owned noncropland are Carter, Cocke and Johnson counties, all of which are bordered by the Unaka range on the southern edge of the region.

It has been hypothesized by some researchers that the amount of

¹⁰"Federally owned noncropland" is defined as all federally owned land except cropland operated under lease or permit (31, p. 12).

federally owned land in a county has some effect on the value of farm real estate. The effect is an indirect one:

Everytime a piece of property falls into the hands of the Forest Service, the tax revenue formerly received from it is gone for good and the remaining property owners must share this loss in revenue. (The Forest Service) . . . purchases private land as it becomes available with our federal tax money, and use it in fact to undermine the local tax sources where our local revenue must come from to support our local government (12, p. 4).

As more lands become federally owned in an area, the effective tax rate per acre in a county necessarily rises ceteris paribus since the federal government typically pays a nominal fee or nothing at all. One would expect, therefore, that those counties with a higher percent of federal land would have a higher effective tax rate per acre all other variables constant. The higher effective tax rate is capitalized into the value of the property and diminishes its per acre value.

The correlation between the percent of federal noncropland in a county with the average value of farm real estate was not significant (.12). If in fact a relationship between federal land and the effective tax rate on property exists as hypothesized, in the case of the Upper East Tennessee region, it appears that other forces are more important and mask the relationship.

Gross Farm Income

Pasour and Mundy included the market value of crops and forestry products per acre of land in farms as variables in their respective models. In both models the relationship was significant. The purpose of using this variable was to reflect the variation in the income generating capacity of the land in the different counties. In the Appalachian area, the fertility and lay of the land vary considerably

because of the mountainous topography. Geographic characteristics influence the kinds of agricultural activities that are and can be pursued; they consequently circumscribe the income-generating capacity of an area at a particular time. The actual as well as potential returns from different agricultural activities influence the value of farm real estate. As mentioned previously, the high net returns to tobacco production and its relatively high rent are capitalized into the value of the land on which the tobacco is produced. The allotment, by limiting production and consequently increasing returns to the factors of production, adds value to the land, one of those factors. Likewise, the net returns from other agricultural activities influence the value of farm real estate:

. . . farm real estate values are determined, in part, by the capitalization over time of net returns to real estate from farm production (18, p. 4).

An increase of \$10.00 per acre in the average annual market value of crops and forestry products sold per acre of farmland, . . . was associated with an increase of \$19.90 per acre in the average value of farm real estate (21, p. 552).

Theory suggests that land prices are closely tied to net farm income. Land prices reflect expected future earning power of the land, and such expectations would likely be formulated from past and present earnings (28, p. 259).

The long-rise in farmland prices is apparently explainable by increasing returns to farmland. For this and a number of other reasons, the hypothesis that a large part of the rise in farmland prices results from the pressure of urban expansion is unwarranted (25, p. 50).

The ratio, gross farm income from the sale of all agricultural and forestry products by county divided by the number of inventory acres, was considered to be an appropriate indicator of the income-generating capacity of the land in each county. When this was correlated with the

average value of farm real estate, there was a significant positive correlation (.58) as was anticipated. Gross farm income per inventory acre was also significantly correlated with the percent of the county in urban and built-up areas, cropland acres, pasture, and forestland.

Soil Types I-III

Land-use capability classes are indicative of the quality of land in an area. As indicated previously, the Upper East Tennessee region, because of the mountainous terrain, has relatively fewer Class I-III acres than the state as a whole. There are, therefore, relatively fewer of the more level and easy to cultivate acres in the region than in the state. Within the region there is substantial variation in the percent of a county's inventory acreage which is classified in these first three classes. Johnson County had the least with 8 percent of inventory acres in Class I-III and Washington County had the most with 52 percent. The average for the region was 27 percent.

The percent of a county in Class I-III soils was positively correlated with the average farm real estate value (.61). The amount of level and fertile land was also positively correlated with the percent of a county that is urban and built-up, the percent in cropland acres, the percent in pasture, and gross farm income per inventory acre; it was negatively correlated with the percent of a county in forestland.

IV. TRENDS IN LAND USE IN UPPER EAST TENNESSEE

It has been shown cross-sectionally that population density and the percent of a county classified as urban and built-up, both indicators of urban development, were in 1969 positively correlated with the average

value of farm real estate in a county. Cross-sectional data, however, do not provide us with a sense of how land uses are changing over time. Intuitively we know that the decline of the farm sector in terms of population and income, and the growth of the urban sector in terms of population and income, are secular trends which manifest themselves across the nation. This will undoubtedly lead to more and more intensive uses of land. It is best, however, to document these shifts to make sure that our intuition is in line with the reality of land use in the region.

According to the Conservation Needs Inventory, which evaluated land use in all counties in the state in 1958 and then again in 1967, land-use shifts in the region have occurred as one might expect in most cases. Land classified as urban and built-up (Table 4) has increased by 25 percent from 138,000 acres to 172,900 acres over the 10-year period. This is a more dramatic increase than the 16 percent increase in this land-use classification across the state. It is consistent with the fact that the region with respect to population and nonfarm income has grown more quickly than the state as a whole.

Inventory acreage in the region declined, as one might expect, by 6 percent over the 10-year period. The decline was accounted for by the diversion of land from inventory uses to "urban development, water, and highway rights-of-way" (31, p. 1). Across the state, inventory acreage declined by only 2.6 percent. This again is consistent with differential rates of growth.

Declines in cropland in both the region and state are understated because of a change in definition. In 1958, idle cropland was classified

TABLE 4

CHANGES IN LAND USE IN UPPER EAST TENNESSEE AND THE STATE BETWEEN 1958 AND 1967

Land Use	Upper East Tennessee			State of Tennessee		
	1958	1967	Percent Change	1958	1967	Percent Change
Inventory acres	2,179,700 (84.7) ^a	2,044,900 (79.5)	-6.2	24,226,000 (91.6)	23,585,800 (89.2)	-2.6
Federal noncropland	341,000 (13.3)	344,600 (13.4)	+1.1	1,218,500 (4.6)	1,352,200 (5.1)	+11.0
Urban and built-up	138,300 (5.4)	172,900 (6.7)	+25.0	1,176,800 (4.4)	1,362,000 (5.1)	+15.7
Cropland	658,100 (25.6)	448,800 (17.4)	-31.8	7,153,700 (27.1)	7,008,700 (26.5)	-2.0
Pasture	483,900 (18.8)	495,700 (19.3)	+2.4	3,371,800 (12.7)	3,464,500 (13.1)	+2.7
Forest	859,900 (33.4)	1,002,000 (38.9)	+16.5	11,756,400 (44.4)	12,106,600 (46.2)	+3.8
Other	181,600 (7.1)	98,000 (3.8)	-45.9	1,944,100 (7.4)	875,700 (3.3)	-54.9
Total land area	2,573,000 acres			26,443,500 acres		

^aNumbers in parentheses represent percents of total land area.

Source: Tennessee Soil and Water Conservation Needs Inventory, 1967.

as "other," whereas in 1967 it was classified as "cropland" which means that the actual decline in cropland in the region was even greater than 32 percent. Such a dramatic decline is somewhat unexpected. It might be hypothesized that some of this acreage, besides being diverted to urban uses, has been diverted to less intensive agricultural uses--namely pasture and forest.

In support of this hypothesis are the moderate increases in pasture acreage and more substantial increases in forestland over the 10-year period. Pasture acreage increased 2.4 percent from 483,900 acres to 495,700 acres. Forestland increased more dramatically by 16.5 percent from 859,900 acres to 1,002,000 acres. One might expect that urbanization manifested by growing population, increases in aggregate nonfarm income, and rising farm and nonfarm real estate values would lead to more intensive uses of agricultural land. This is not the apparent trend in Upper East Tennessee. The explanation is threefold. First, the topography of the region has limited the growth of farms to small uneconomic units. Second, industrial growth has provided job opportunities for a large proportion of farmers so that intensive agricultural use of land is not imperative, at least not for this subpopulation. And finally, burley tobacco production has continued to be important. Tobacco is an intensive use of land but in the aggregate represents only 1.1 percent of the region's farm land.

V. THE EFFICIENT USE OF FARMLAND IN UPPER EAST TENNESSEE

It is obvious that given a certain level of technology, some lands are more productive than others agriculturally. Crops, for instance,

cannot be efficiently cultivated on the side of a mountain. Similarly well drained and fertile bottomlands are not efficiently used for the production of timber. The extent to which a region is using its agricultural lands "properly" can be evaluated by comparing the use of the land with its land capability classification.

In the region 9.5 percent of inventory acreage classified as being in field crops in 1967 occupied the poorer Class VI and VII soils. This compared with 5.1 percent for the state. The implication here is that more land in the region was used for field crops on land ill suited for this use than across the state.

Commercial and noncommercial forestland in the region occupies 39 percent of all inventory land. About 18 percent of this particular use classification occupies the better Class I-IV soils and represents either an uneconomic or nonrecommended use of land. Across the state 37 percent of forestland occupies Class I-IV soils, which again represents an uneconomical or nonrecommended use.

Class III-VII soils are generally considered to be more suited for pasture, orchards and woodland than for crops. The Class I-II soils have little to moderate conservation problems and are, therefore, suited for the higher yielding, more intensive kinds of agricultural uses. Pasture is generally considered an extensive use of land but nevertheless 14 percent of land classified as pasture in 1967 occupied the better Class I-II soil types. Across the state 27 percent of the land classified as pasture occupied the better soils.

VI. SUMMARY

In describing the economic milieu in which farmland consolidation and fragmentation occur in the Upper East Tennessee region, the following characteristics stand out:

1. Farms in the region are small, averaging about 65 acres. The average size of a farm in the region has not changed appreciably in the last 25 years.
2. Nonfarm income and population in the region have increased at a faster rate than in the state. Land classified as urban and built-up is also increasing at a faster rate than in the state.
3. Part-time farmers make up a considerable proportion of the total farmers in the region. There is also a higher concentration of marginal Class 5 and 6 farms than in the state.
4. Four mountain ranges traverse the 12-county area in a southwest to northeasterly direction. The amount of level land in the region is consequently below the average for the state.
5. The government allotment program for burley tobacco continues to assure a large number of farmers in the region (83 percent) a high return for that crop. The prevalence of burley production in the region may explain partially why small acreages persist.
6. The price of farmland in the region is higher than in the middle and western regions of the state. In the region, there is a significant positive correlation between average farmland value and the percent of a county in urban and built-up, the

percent of a county in cropland, gross farm income per inventory acre, percent of inventory acreage in Class I-III soils, and population density. Average farmland value is negatively correlated with the percent of a county in forestland and average farm size.

7. Major changes in land-use classification in the region are increases in urban and built-up areas, pastureland and forestland. Decreases have occurred in overall inventory acreage, especially in cropland acres.

CHAPTER III

FARMLAND TENURE IN UPPER EAST TENNESSEE

The previous chapter described important factors in Upper East Tennessee which have affected the value and therefore the supply of farmland in the region. The purpose of this chapter is to focus on the individual farmer in the region and the manner in which he presently holds his land resource. Succeeding chapters will deal in greater detail with processes that have shaped the current tenure pattern.

I. CHARACTERISTICS OF FARMERS BY TENURE

In Upper East Tennessee, as in other areas of the country, four tenure categories tend to predominate in the agricultural sector. They are the full-owner operator, the full-owner operator-landlord, the part-owner operator, and the tenant.

The full-owner operator is by definition a farmer who operates only the land to which he holds fee simple title. He does not rent in any additional land. In the region, this tenure category is currently the most common, representing 67 percent of the total number of farm operators. Of this number 12 percent are considered full-owner operator landlords because they were renting-out land to farmers and other individuals in 1975. According to the last Agricultural Census, 81 percent of farm operators in the region were full-owner operators in 1969. A 1966 study showed that 84 percent of East Tennessee landholders were full-owner operators (17, p. 25). Clearly this tenure category has been the most prevalent in the region over the last 15 years.

The next most important tenure group are the part-owner operators who hold title to part and rent in part of the land they farm. This manner of controlling the land resource has often been termed more rational and flexible whereby one "can expand or contract his operation with more ease" (6, p. 185). According to the sample, 25 percent of farmers in the region are part-owner operators. The 1969 Agricultural Census showed that only 13 percent of farmers in the 12-county region were part-owner operators in that year. An earlier landownership survey in 1960 showed 14 percent of landholders were part-owner operators in East Tennessee (17, p. 25).

Farm tenancy is the least common of the tenure categories. Only 4.2 percent of current farm operators in Upper East Tennessee rented all the land which they farmed in 1975. The 1969 Census showed that 6.3 percent of all farm operators were classified as either tenants or managers.

Relative to the rest of the state and the nation, the region under study has more full-owner operators and fewer part-owner operators and tenants. In terms of farmland controlled either through ownership or lease, full-owner operators in the region control a greater amount of land than the same tenure group in the state and nation. Part-owner operators, on the other hand, control fewer acres (Table 5).

Evidence from the survey indicates that the trend in the region is toward fewer full-owner operators and tenants and more part-owner operators. The acreage under the control of these different tenure groups has followed a similar pattern (Table 6).

TABLE 5

FARMLAND TENURE IN UPPER EAST TENNESSEE, STATE OF TENNESSEE,
AND THE UNITED STATES, 1969

	Full-owner operators		Part-owner operators		Tenants and managers	
	% of farms	% of acres	% of farms	% of acres	% of farms	% of acres
Region	80.7	74.4	13.0	20.9	6.3	4.7
State	76.8	65.1	15.7	28.2	7.5	6.7
Nation	62.5	35.3	24.6	51.8	12.9	12.9

Source: Census of Agriculture.

TABLE 6

FARMLAND TENURE, UPPER EAST TENNESSEE, 1975

Tenure classification	% of farms	% of acres
Full-owner operator	70.7	56.0
Part-owner operator	25.1	37.0
Tenant	4.2	6.5

Source: 1975 survey of 287 farms in Upper East Tennessee.

Age

The average age of all farmers in the region is 50 years. This is slightly lower than the 1969 estimate of 53 years. The decline in average age alludes to a possible shift in the age distribution to the younger side. It would appear, if the shift has actually occurred, that the rate of entry of younger farmers is greater than the rate of exit of older farmers (Table 7).

Age is associated with the manner in which a farmer holds his land resource. Acquisition of land has often been tied with the concept of the "agricultural ladder" wherein a young farmer with limited resources is able to expand his resource base through savings and prudent investment over time. The implication here is that the older the farmer the greater his resource base which includes real estate.

In Upper East Tennessee, tenants were on the average the youngest group of farmers. They averaged 36 years. They controlled through renting an average of 129 acres in 1975, more land than any other tenure group.

Part-owner operators averaged 45 years of age and controlled, through ownership and lease, an average of 121 acres.

Full-owner operators averaged 51 years of age and controlled through ownership only an average of 59 acres.

The oldest tenure group was the full-owner operator-landlords who averaged 61 years of age and controlled through ownership an average of 96 acres. These farmers rented out an average of 26 acres to other individuals and farmers in the region.

All possible paired means of age among the four tenure groups were significantly different at the 95 percent level of confidence.

TABLE 7

AVERAGE AGE, EDUCATION, AND FAMILY SIZE OF FARMERS IN DIFFERENT TENURE GROUPS,
FARMERS IN UPPER EAST TENNESSEE, 1975

Tenure group	Average age ^a	Education ^b	Family size ^c	Land owned in acres ^d	Land rented in acres, '75	Total land controlled ^e in acres	Land rented out in acres	No. of farmers surveyed
1. Full-owner operator	51.4	9.2	3.1	58.7	--	58.7	--	(150)
2. Full-owner landlord	61.2	10.3	2.5	96.1	--	70.3	25.8	(26)
3. Tenant	35.7	9.7	4.4	0.0	128.6	128.6	--	(10)
4. Part-owner operator	45.2	9.9	3.7	65.7	55.4	121.1	--	(66)

^a All paired means were significantly different at the 95% level.

^b All paired means were not significantly different at the 95% level.

^c 1 and 4, 2 and 3, 2 and 4, 1 and 2, were significantly different at the 95% level.

^d 1 and 2 were significantly different at the 95% level.

^e 1 and 4, 1 and 2, were significantly different at the 95% level.

Source: 1975 survey of 287 farmers in Upper East Tennessee.

Off-Farm Employment

Farmers in Upper East Tennessee have relied to a great extent on off-farm sources of income as a supplement to their farm income. The growth of industry in the area and the concomitant expansion in job opportunities is a principal explanation of this phenomenon. About 49 percent of the farmers in the sample were employed full-time off the farm in 1975; that is, they worked 20 or more days a month off the farm. The average off-farm income of those reporting off-farm employment was \$4,709 per annum. The tenure category of the farmer was not significantly associated with off-farm employment.¹¹ There was, however, a significant difference¹² between the mean off-farm income of full-owner operators and part-owner operators (Table 8, Appendix Table 24).

Farm Income

One would expect that the manner in which a farmer controls his land resource and the size of that resource are associated with his ability to generate income on his farm. The tenure group in the sample that had the greatest gross farm sales¹³ was the part-owner operators, who averaged \$10,444 in 1974. The lowest was the full-owner operator-landlords averaging \$2,024. All but two of the paired means were significantly different at the 95 percent level (Table 8, Appendix Tables 25, 26).

¹¹Chi-square test at the .05 level of significance.

¹²Significant difference here and throughout refers to a T-test of significance at the 95 percent level.

¹³"Gross farm sales" was a rough estimate of total sales of agricultural products including crops, livestock and forestry products.

TABLE 8

ANNUAL GROSS FARM, NET FARM AND PER CAPITA INCOMES BY TENURE,
FARM OPERATORS IN UPPER EAST TENNESSEE, 1974

Tenure group	Gross (\$/yr.) ^a	Net (\$/yr.) ^b	Net/ gross	Off-farm income ^c	Per-capita income ^{d,e}
1. Full-owner operator	\$3,386.34 (134)	\$996.55 (100)	.40	\$4,830.60 (145)	\$2,642.72 (93)
2. Full-owner operator-landlord	2,023.70 (27)	753.26 (23)	.10	3,100.80 (25)	1,491.01 (19)
3. Tenant	2,952.50 (8)	1,316.67 (6)	.31	4,127.20 (10)	2,051.16 (6)
4. Part-owner operator	10,444.39 (64)	2,490.57 (51)	.36	5,165.28 (62)	3,048.65 (47)
Total population	5,152.23 (233)	1,399.44 (180)	.35	4,709.35 (242)	2,604.21 (165)

^aThe means of the following pairs 1 and 4, 2 and 4, 3 and 4, 1 and 2 were significantly different at 95% confidence level.

^bThe means of 1 and 4, 2 and 4 were significantly different at 95% level. The means of 3 and 4 were significantly different at the 90% level.

^cThe means of 1 and 4 were significantly different at the 95% level.

^dThe means of 1 and 2, 2 and 4 were significantly different at the 95% level.

^e $\frac{\text{Net farm income} + \text{operator's off-farm income} + \text{spouse's off-farm income}}{\text{family size}} = \text{Per capita family income}$

Numbers in parentheses refer to farmers analyzed in that category.

Source: 1975 survey of farmers in Upper East Tennessee

Net farm income¹⁴ varied similarly among the tenure groups. On the average, part-owner operators had the highest net farm income, \$2,491, while full-owner operators had the lowest, an average of \$753.

The ratio of net farm income to gross farm sales is a crude efficiency indicator. The full-owner operators had the highest ratio, .40, while the full-owner operator-landlord had the lowest, .10, for 1974 (Table 8).

Per Capita Income

In an effort to develop an indicator of overall well-being between and among tenure groups, three important sources of income accruing to a farm household (off-farm income of operator and spouse and net farm income) were summed and then divided by the number of family members in the household. Although this is considered a reasonable indicator given the data available, it suffers from two shortcomings. First, there was no account of other possible sources of income. This would tend to bias the results, especially in the case of the older farmers who depend to some extent on transfer payments (i.e. social security, etc.). Second, the net farm figure is only representative of one year, 1974, and, therefore, does not reflect the chronic volatility of farm product prices. It was found, for example, that beef production was one of the principal agricultural activities in the region. In the period of the survey, beef prices were particularly low relative to other periods. Between the years 1973 and 1974 cash receipts from the sale of cattle and calves in the state of

¹⁴"Net farm income" was a rough estimate of that income which remained after expenses were subtracted from gross farm sales.

Tennessee declined 57 percent as the average price for cattle and calves per 100 pounds dropped from \$40.00 to \$28.60 and from \$54.80 to \$39.40, respectively (32). Farmers who concentrated heavily in the area of beef cattle production would be classified in a lower per capita income bracket only because of the erratic beef market.

We can assume, however, that farming in Upper East Tennessee is quite homogeneous with respect to agricultural activities. According to the 1969 Census, 92 percent of gross farm receipts in the region were from the sale of livestock products and tobacco. Sixty-five percent of the farmers reported an average of 20 cattle and calves in inventory in 1969. A similarly large percentage, 83 percent, reported production of an average of .92 acres of burley tobacco. Changes in product prices, then, affect farmers in a similar manner across the region except those who have specialized operations such as dairy operations. These, however, are a relatively small number. For example, in 1969 only 7.4 percent of the region's farmers reported 10 or more milk cows. Although we cannot use the per capita indicator to discriminate absolute levels of well-being among the tenure groups, we can gain a sense of the relative distribution of income among groups assuming a certain amount of homogeneity in productive activities.

According to the sample, 26 percent of farm households in Upper East Tennessee had a per capita income of less than \$1,000 in 1974 (Appendix Table 27). Part-owner operators and full-owner operators were the best off with average per capita household incomes of \$2,643 and \$3,049, respectively. The other two tenure groups were in a less privileged position based on this income criterion. Tenants and full-owner operator-landlords had per capita household incomes of \$2,051 and

\$1,491, respectively. It is very probable that the average income figure for the full-owner operator-landlord group was low because transfer payments were not fully accounted for in the indicator. That average age of farmers in this last group was 61 years suggests that such payments may be an important income source to this last group.

Paired T-tests indicated that there was a significant difference in the average per capita income in 1974 between full-owner operator and full-owner operator-landlord households and between full-owner operator landlord and part-owner operator households. These differences, again, must be viewed in light of the shortcomings of the indicator.

There does not appear any substantial relationship between tenure classification and per capita income. This is not surprising considering the importance of off-farm income to a great number of the farmers in the region. There is no direct and obvious relationship between the manner in which an individual holds the land and what he earns off the farm. In the case of gross farm sales as indicated earlier, there appears to be a much more defensible relationship.

II. CONCENTRATION OF FARMLAND OWNERSHIP

Farmers as a group control the greatest amount of land in the Upper East Tennessee region. As indicated in the previous chapter, the number of acres in farmland is declining as competing interests take control of land formerly devoted to agriculture. Nevertheless, farmers in the region, who represented a mere 5.1 percent of the population in 1969, controlled 61 percent of the region's land area at that time (33).

Farm units in the region are by no means similar in land area.

According to the sample, the size of a farm ranged from one acre to 568 acres. The median size was 32 acres and the mean was 60 acres. Thirty percent of the farms were less than 20 acres. This reflects in large part the broad definition of "farms" used in the survey. An operating unit was considered to be a farm if gross farm sales amounted to at least \$50 in the previous year and if the farm's land area was greater than or equal to 10 acres. If a farm was smaller than 10 acres, gross farm sales had to be at least \$250 in the previous year. With the prevalence of tobacco production, which generally assures a relatively high return on a small acreage, an individual operator did not need much land to be classified as a farmer.

Concentration of farmland is an important characteristic of a region's agricultural sector because it indicates the distribution of an income generating asset. By arraying all the ownership units by number of acres from smallest to largest, dividing the groups into deciles according to land owned and number of farm operators, and then plotting percentages of land owned by percentage of farmers, we derive a "concentration curve" (Figure 2) (17, p. 33). A strait line drawn diagonally across the graph indicates a perfectly equal distribution of farmland among farmers; i.e., 50 percent of the farm operators own 50 percent of the land. Deviations from the diagonal indicate different degrees of farmland ownership concentration.

In Upper East Tennessee farmland is not distributed equally (Table 9). The concentration curve indicates that approximately 50 percent of the farmland is owned by only 15 percent of the farm operators in the region. Renting tends to move the curve closer to the diagonal,

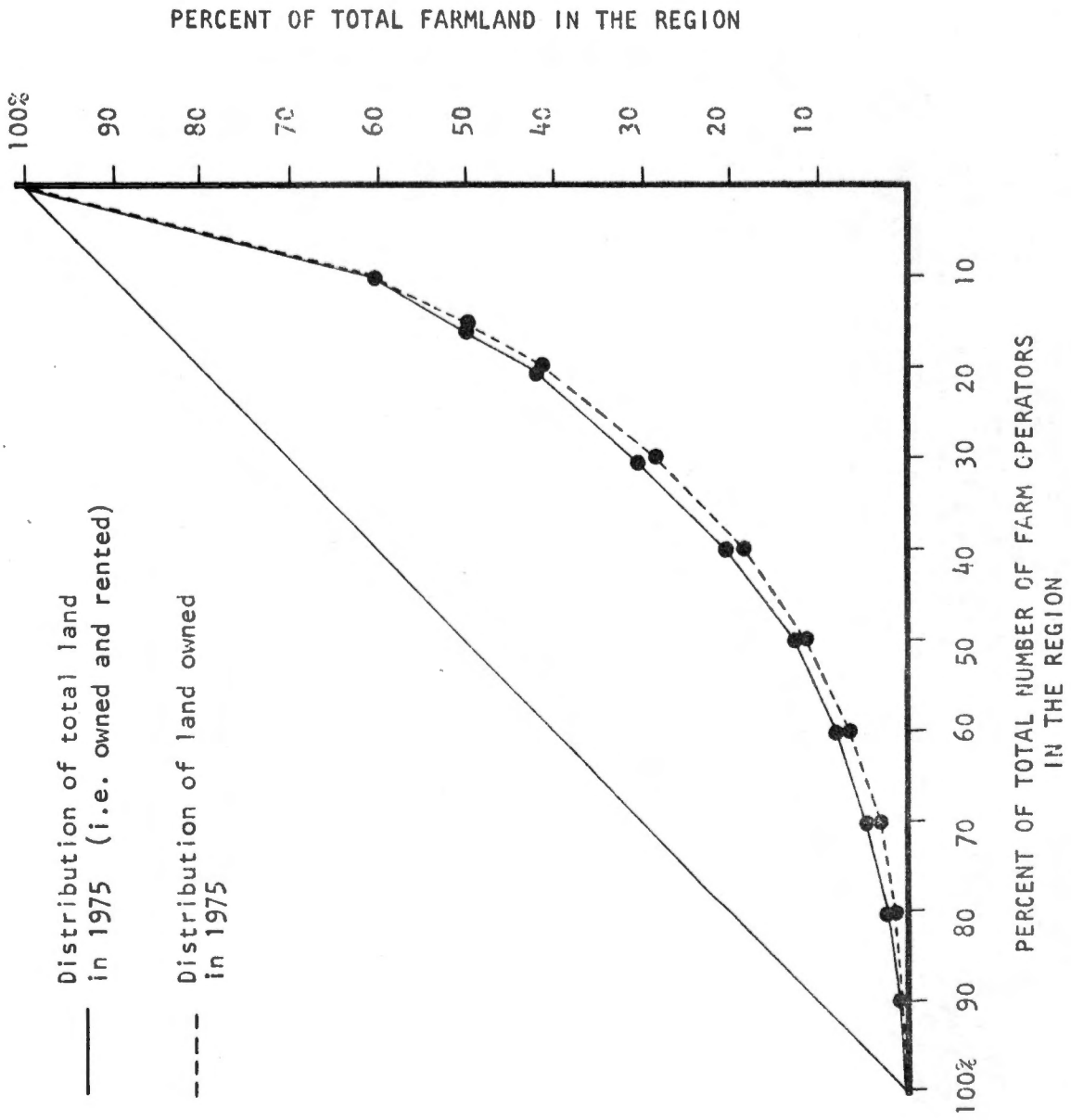


Figure 1. Concentration of farmland owned and total farmland controlled, upper East Tennessee, 1975.

TABLE 9

CONCENTRATION OF FARMLAND OWNERSHIP BY NEARNESS TO POPULATION CENTERS^a,
FARMERS IN UPPER EAST TENNESSEE, 1975

	Near population centers	Middle distances from population centers	Farthest from population centers	Entire Region	
	% of farmland owned	% of farmland owned	% of farmland owned	% of farmland owned	% of farmland controlled through ownership and renting
% of farm operators					
10	n=89 .6	n=94 .8	n=101 .5	n=284 .2	.4
20	2.2	2.3	2.0	1.2	1.7
30	4.9	5.6	4.6	3.4	4.5
40	9.6	10.4	8.5	6.6	7.9
50	13.5	15.5	15.3	11.7	12.5
60	19.9	21.0	24.0	18.8	20.2
70	30.5	30.3	35.6	28.8	30.5
80	43.4	51.5	50.0	41.9	42.0
90	61.6	75.7	68.1	60.5	60.5
100	100.0	100.0	100.0	100.0	100.0

^a Sample areas were classified according to their distance from population centers which were weighted according to their population. See Chapter V for more detail on methodology.

Source: 1975 survey of farmers in Upper East Tennessee.

indicating that control of farmland is somewhat more equitable with the practice of renting in land.

The curve does not reflect the distribution of land according to its value which is largely determined by the "quality of soil, nearness to market, expected future value, and many other factors" (17, p. 33). There is not, however, a significant difference in the distribution of farmland by location; that is, the nearness of an area to a population center does not affect significantly the distribution of farmland in that area among farmers. The farther one goes from population centers in the region, the larger the farms and the larger the total area devoted to agriculture. So distance, a proxy for value, has no significant effect on the distribution of farmland in the region. The distribution patterns are similar regardless of location to urbanizing areas.

III. SUMMARY

1. The most common tenure category in Upper East Tennessee is the full-owner operator who holds fee simple title to all the land he operates. Based on census data and a recent random sample of farmers in the area, it appears that the part-owner operator is becoming a more important phenomenon in the region. This is consistent with the state and national patterns. Part of the explanation relates to the cost of land in the region and the attractiveness of renting as an alternative to buying.

2. From the standpoint of income, the part-owner operator in Upper East Tennessee had the highest average off-farm salary in 1975 and net farm income, gross farm income, and per capita income in 1974

than the other three categories. It is impossible to say unequivocally that this has to do with the manner in which the part-owner controls his land resource. Gross farm and net farm incomes are clearly related to the land resource. The relationship between per capita income and off-farm income and land tenure is less clear. One might expect, for instance, that a farmer with a secure off-farm income might be in a better position to purchase land even when the value does not reflect its value in agricultural use. On the other hand, a secure off-farm source of income might be sufficient reason for a farmer to contract his operation, sell land or rent it out. It seems reasonable to conclude that part-owner operators have higher average gross and net farm incomes due in part to the flexibility of their tenure. Owning some land and renting the rest gives the farmer the flexibility to expand or contract his operations according to exogenous influences on the products he produces.

3. The prevalence of the full-owner operator currently as well as historically in the region despite evidence that full-ownership is not the most economic way to hold land might be partially explained by the cultural importance of "independence" in the region. According to a recent study, East Tennessee farmers "were less favorable in their attitude (toward credit) than were Middle and West Tennessee farmers" (27, p. 7). Eighty-one percent of our sample agreed to various degrees with the statement "I don't like to feel obligated to other people." Renting land necessarily implies an obligation to someone else, a kind of breach of one's independence.

4. Another possible explanation of the prevalence of full-owner operators is the sheer lack of land to rent. Given a relatively limited

supply of class I-II soils and a disproportionately high concentration of farmers in the 12-county area, it is not unreasonable to hypothesize that land for rent is just not available in the right places and in the right amount.

Probably the most appropriate explanation of relatively few part-owner operators is the continual decline of agriculture in the region that was documented in Chapter II.



CHAPTER IV

THE PROCESS OF FARMLAND CONSOLIDATION AND FRAGMENTATION IN UPPER EAST TENNESSEE.

A description of the current farmland tenure pattern in Upper East Tennessee does not give us a sense of how the pattern was shaped over time. This chapter, based on a survey administered in the summer of 1975, will focus on the historical processes that have shaped the current ownership pattern in the region.

The ownership of farmland resources in Upper East Tennessee is constantly changing as land is bought and sold, transferred from one individual to another. For many farmers control of farmland through ownership has been a goal that represents the top of the so-called agricultural ladder. As something to aspire to, it is difficult to evaluate in a strictly economic sense. Recent evidence indicates that a combination of both owned and rented land is more profitable on the average than operating only that land which is owned (6). Clearly from the standpoint of income per capita and other income criteria part-owner operators in the 12-county region are better off economically. Nevertheless, full-owner status is the most common arrangement in the region controlling the greatest proportion of the farmland resources.

Climbing the agricultural ladder is a dynamic process that occurs over time as the young farmer saves, often through material sacrifice, so that he can invest in his farm, improve it, and put together the "critical mass" of land and resources he needs to be viable. This process of farm growth usually but not always involves the consolidation of land resources.

In this chapter we will examine two important regional processes involving the land resource: the consolidation and fragmentation of farmland resources. The analysis will be based on a 1975 survey of farmers in Upper East Tennessee.

I. CONSOLIDATION OF FARMLAND RESOURCES

The First Acquisition of Land

Access to land can be accomplished through purchase, inheritance or rental arrangement or through a combination of two or more of these alternatives. With the exception of tenant farmers, all farmers in the region acquired an initial parcel of land either through purchase or inheritance. For 60 percent of the farmers in the survey there were no additional acquisitions; their first acquisition was their last. Forty percent of the sample at one time or another purchased or inherited additional land to enlarge their initial base.

There has been a general trend in Upper East Tennessee toward smaller and smaller first acquisitions, and higher and higher price paid per acre of farmland.

The average size of the first acquisition before the 1930's was 62 acres. In the 1930's the average size increased to 68 acres but since then the average size has decreased with each passing decade. In the 1970's, for example, the average first acquisition was only 26 acres (Table 10).

It is interesting to note that the portion of these first acquisitions considered to be cropland has remained more or less constant over time. Before 1930 "cropland" represented about 48 percent of first

TABLE 10
 SIZE OF FIRST ACQUISITION AND CURRENT SIZE OF FARMS,
 UPPER EAST TENNESSEE

Year of first acquisition	Size of first parcel	Current size of farm, 1975	No. of farmers
Before 1930	61.8 acres	121.8 acres	(13)
1930-1939	68.1	108.3	(20)
1940-1949	62.4	106.8	(45)
1950-1959	38.7	53.4	(68)
1960-1969	34.0	43.0	(83)
After 1969	26.0	27.3	(31)
Mean	43.1	63.8	(260)

Source: 1975 survey of farmers in Upper East Tennessee.

acquisitions. The highest ratio of cropland to total land was 62 percent during the 1950's.

Accompanying the trend toward smaller and smaller first acquisitions has been the rising per acre price of farmland in the region. Before 1930 purchased land averaged \$149 per acre. During the 1930's, there was a drop in the average per acre price to \$61. From the 1940's to the present there has been a steady rise from \$144 to \$718 per acre (Table 11). The price per acre of smaller parcels of land has risen more sharply than that for larger parcels (Figure 2). While the average price of an acre of land has gone up by a factor of five since the 1940's, the consumer price index has only risen two and one half times over the same period.

Method of Acquiring the First Parcel

According to the sample, the most common manner in which farmers in the region acquired their first parcel was through purchase. About 77 percent of the farmers purchased their first parcel while 19 percent gained control through inheritance. Three percent gained control through other means.

Those who purchased their first parcel did so with financing from a variety of sources. The most commonly used source were various commercial banks throughout the region. Cash payments were frequently used to pay for the initial acquisition but this is becoming less common. Of those farmers who purchased their first parcel in the 1940's, 48 percent paid cash. Only 22 percent used this means in the 1970's. By the same token, commercial bank financing has become more important. In the 1940's

TABLE 11

SIZE OF PARCEL, YEAR, AND AVERAGE PER ACRE TRANSFER PRICE OF FARMLAND,
FARMS IN UPPER EAST TENNESSEE

Year of Transfer	Size of Parcel (Acres)				All parcels
	1-5	6-20	21-50	51-	
1929 or earlier	--	\$ 83.00 (1)	\$400.00 (1)	\$ 57.50 (2)	\$149.50 (4)
1930-1939		57.00 (3)	63.40 (7)	57.30 (3)	60.54 (13)
1940-1949	\$725.00 (2)	180.10 (11)	112.50 (13)	94.40 (23)	144.18 (49)
1950-1959	543.00 (10)	463.00 (15)	158.80 (17)	134.60 (24)	273.21 (66)
1960-1969	999.70 (19)	517.80 (31)	329.30 (29)	217.80 (24)	483.72 (103)
1970-later	789.80 (13)	944.40 (23)	531.80 (21)	435.30 (8)	717.52 (65)
Total	\$821.40 (44)	\$558.97 (84)	\$292.31 (88)	\$171.41 (84)	\$409.81 (300)

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

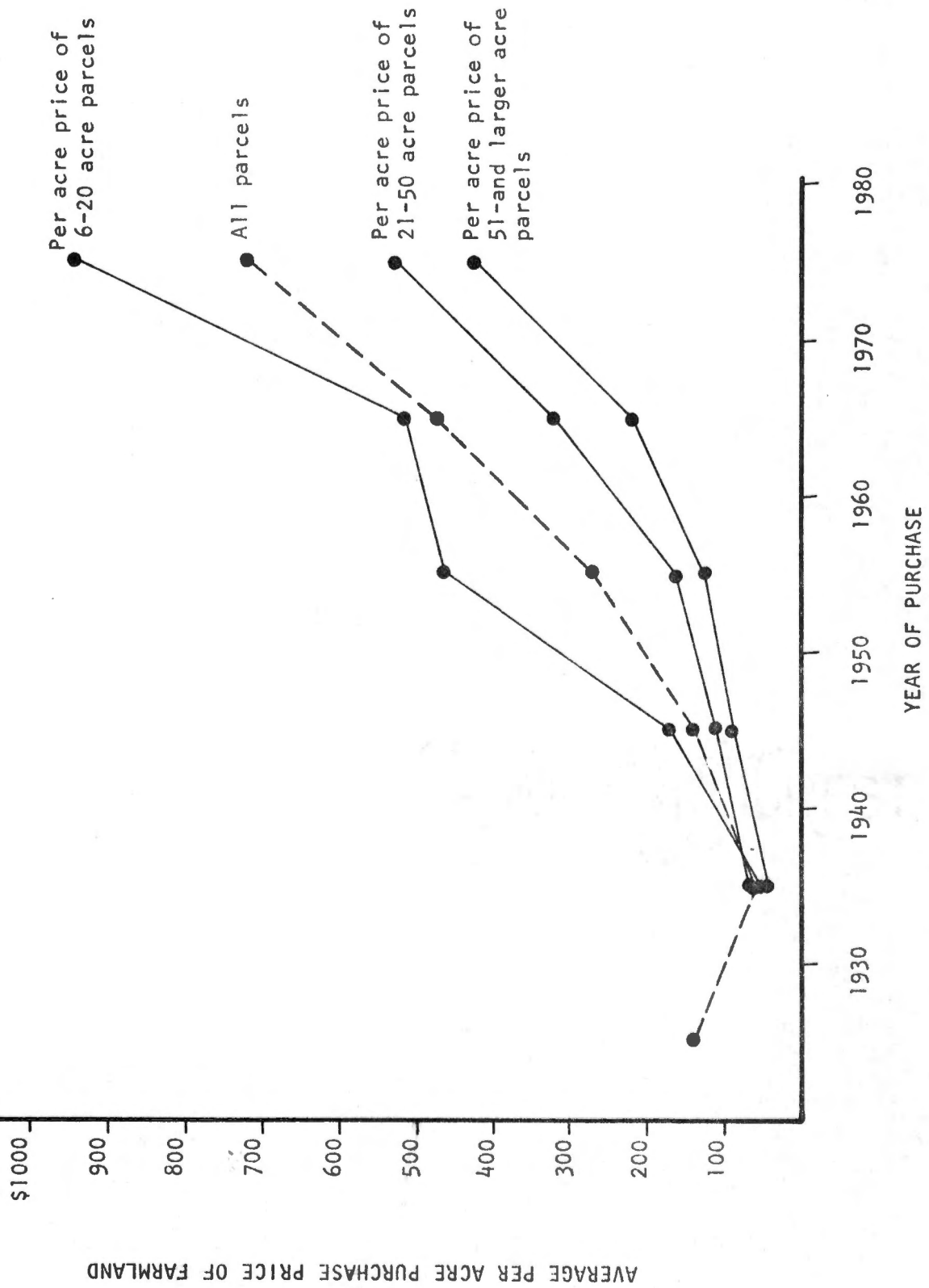


Figure 2. Per acre transfer value of farmland by year and size of parcel, upper East Tennessee.

28 percent of the farmers used commercial bank financing while in the 1970's 38 percent used this means. Another important source of financing was through the seller. About 18 percent of all farmers have used seller financing in the purchase of their first parcel. Other less important sources of financing were the Federal Land Bank (8.3 percent), Farmers Home Administration (5.6 percent), Production Credit Association (3.3 percent), and others including insurance companies, relatives and combinations of two institutions such as the FmHA and a commercial bank (Appendix Table 28). About 80 percent of all purchased first acquisitions were debt free at the time of the survey. The rest remained mortgaged.

Subsequent Acquisitions of Farmland

About 40 percent of the farm population acquired additional land either through purchase or inheritance at one time or another after their first acquisition. Of these farmers, 63 percent acquired only one additional parcel, 27 percent acquired two and 10 percent acquired more than two (Appendix Table 29).

The size of these additional parcels has followed a pattern similar to the size of first acquisitions (Appendix Table 31). During the 1940's, the so-called additional parcels averaged 14 acres. In the 1950's the average size rose to 61 acres and since then has declined to 28 acres in the 1970's. Similarly, the ratio of cropland to total acres in the additional parcels was within a range (40-60 percent) similar to that for the first acquisitions.

As one would expect, the average price per acre of subsequent parcels has risen through time. The per acre prices in different years are similar to those of the first acquisitions. One might expect that

subsequent parcels would be purchased for higher prices on the average. Theoretically, "the value of additional land to the (farm) is reckoned in terms of marginal returns of additional acreage rather than average returns" (13, p. 99-100). Tweeten elaborates: "Already owning the machinery and controlling the labor, (the farmer) budgets the buying price he can afford to pay for additional land at a higher rate than the 'whole-farm' buyer who does not have an existing unit to absorb the fixed costs of equipment and labor" (28, p. 262-263). The evidence in Upper East Tennessee does not support the foregoing assertion. Perhaps one explanation is the greater importance of urban pressure on farmland. The pressure to expand the land area for farming is a weaker determinant of farmland value and, therefore, does not show the differential price per acre of "whole farms" as compared with additions to farms.

Method of Acquiring Subsequent Parcels

Subsequent parcels were more likely to be purchased than were first parcels. About 87 percent of subsequent parcels were purchased compared with 77 percent of the first parcels. Twelve percent of the subsequent parcels were inherited and 1.3 percent were acquired through other means (Appendix Table 28).

Those subsequent parcels that were purchased were financed by a variety of sources, the most common being a cash payment (37.3 percent). Commercial banks were the next most important source (27.3 percent) with seller financing (17.2 percent), Federal Land Bank (8.2 percent), and Production Credit Association (3.6 percent) following behind. When comparing the sources of financing for the first parcel with those of the second, we find that commercial bank financing was relatively less

important while cash payment was relatively more important in the purchase of additional parcels.

Subsequent parcels tend to be less encumbered than the first parcels. Eighty-five percent were debt free while 15 percent were encumbered. This compared with 80 percent of the first parcels that were debt free and 20 percent that were encumbered.

Location of Subsequent Parcels

In an area with as broken a topography as Upper East Tennessee, one would expect some problems in consolidating a land base of contiguous units. Those farmers in the region who have expanded their land base, however, have been able in most cases to expand on land adjacent to their homestead. In 26 percent of the cases, additional parcels have not been contiguous. Thirteen percent were within a mile and another 13 percent were more than a mile removed. The most distant acquisition was 15 miles from the homestead (Appendix Table 32).

Growth of Farms in Land Area

Closely linked with the current size of a farm in the region is the time in which the first acquisition was made. Those farmers who acquired their first parcel before 1930 were able to expand to almost twice the size of their original parcel. The average initial acquisition before 1930 was 62 acres. Those who acquired land then have expanded to an average current size of 122 acres. This contrasts dramatically with those farmers in the region who acquired their first parcel in the 1960's. On the average, this group started out with 34 acres and currently hold 43 acres.

There was no apparent pattern in the way an individual farmer would finance his initial and subsequent purchases of land. Numerous combinations were possible and occurred. There did seem to be a slight tendency for a farmer to use the same source of financing for subsequent purchases as he had used for his initial one. For example, 28 percent of those farmers who purchased three parcels used the same source of financing for their first two purchases and 21 percent used the same source for their second and third. Of those farmers who purchased two parcels, 17 percent used the same source of financing for both purchases.

Although inheritance of the initial parcel has been an important means of access to an essential productive asset, it does not appear to be an important determinant of a farmer's current holding among those who have expanded their land base. For example, those who inherited their first parcel on the average started out with the same amount (38 acres) as those who purchased their first parcel (39 acres). When surveyed in 1975, however, those who inherited the first parcel owned an average of 69 acres while those who purchased their first owned an average of 91 acres (Table 12).

On the other hand, farmers who had not expanded but had inherited their land owned an average of 63 acres. Those in the same nonexpansion group who had purchased their land averaged only 37 acres. It would appear that, among those who have not expanded their land base, inheritance of land has been of considerable importance.

II. CHARACTERISTICS OF FARMERS WHO HAVE EXPANDED THEIR LAND BASE AND THOSE WHO HAVE NOT

This section will focus on some of the differences between those farmers who have expanded their land base and those who have not. The

TABLE 12

THE SIZE OF LANDHOLDINGS OF THOSE WHO HAVE EXPANDED THEIR
LAND BASE AND THOSE WHO HAVE NOT, FARMERS IN
UPPER EAST TENNESSEE

Manner of First Acquisition	Farmers who have not expanded		Farmers who have expanded	
	First Parcel	Current Holding	First Parcel	Current Holding
Inherited	68.1 acres (38)	62.8 acres (37)	37.7 acres (20)	68.6 acres (20)
Purchased	39.7 (119)	37.4 (119)	39.4 (85)	90.9 (84)
Other	24.0 (4)	24.0 (4)	69.5 (2)	230.0 (2)
Total	46.0 (161)	42.9 (160)	39.3 (107)	90.6 (106)

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

preceding section has been concerned with some of the temporal characteristics of that group which has expanded its land base. By comparing the two subpopulations we will be able to evaluate the relative importance of land expansion to several criteria of well-being.

Land Owned and Land Rented

Farmers in the region who had expanded their land base owned a significantly larger acreage on the average than those who had not in 1975. They owned on the average 93 acres and, when considering land rented in, controlled an average of 114 acres. Those farmers who had not expanded their land resource owned on the average 43 acres and, with land rented, controlled an average of 52 acres (Table 13).

Gross and Net Farm Income

There were significant differences between the two groups with respect to gross and net farm income in 1974. Farmers who had gone through a process of expansion grossed on the average \$7,359 and netted an average of \$1,773 in that year. Farmers who had not expanded grossed on the average \$3,342 and netted on the average \$1,094. It appears that the expansion of one's land resource had a significant effect on gross and net farm income (Table 14).

Off-Farm Employment

Although there was not a significant difference in the off-farm income of the two groups, there was a significant difference in the average number of days worked off the farm. Those farmers who had expanded their land base averaged 9.4 days a month of work off the farm

TABLE 13

CHARACTERISTICS OF FARMERS WHO HAVE EXPANDED THEIR LAND BASE
THROUGH PURCHASE AND/OR INHERITANCE AND THOSE WHO
HAVE NOT, UPPER EAST TENNESSEE, 1975

Tenure	Land Owned (acres)		Total Land Controlled (owned and rented)		Age		Days worked off farm per month	
	Those who have not expanded	Those who have expanded	Those who have not expanded	Those who have expanded	Those who have not expanded	Those who have expanded	Those who have not expanded	Those who have expanded
Full owner operator	40.7 (99)	90.5* (56)	40.7 (99)	90.5* (56)	51.0 (99)	52.0 (56)	12.7 (99)	9.7 (56)
Full owner operator- landlord	92.3 (16)	99.8 (16)	92.3 (16)	99.8 (16)	59.6 (16)	62.9 (15)	10.3 (15)	7.6 (16)
Part-owner operators	35.0 (35)	100.0* (31)	76.5 (35)	171.4* (31)	43.0 (35)	46.0 (31)	10.9 (35)	10.2 (31)
Total land owning population	42.7 (161)	93.0* (108)	51.8 (161)	113.6* (108)	49.8 (161)	51.7 (108)	12.5 (161)	9.4* (109)

* Significant differences in paired means at 95% level.

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 14

CHARACTERISTICS OF FARMERS WHO HAVE EXPANDED THEIR LAND BASE
THROUGH PURCHASE AND/OR INHERITANCE AND THOSE WHO
HAVE NOT, UPPER EAST TENNESSEE, 1974

Tenure	Gross Farm Income		Net Farm Income		Off-Farm Income		Per-Capita Household	
	Those who have not expanded	Those who have expanded	Those who have not expanded	Those who have expanded	Those who have not expanded	Those who have expanded	Income \$ /year	Those who have not expanded
Full owner operator	2,656 (80)	4,533 (53)	894 (62)	1,164 (38)	5,320 (92)	4,005 (52)	2,369 (57)	3,075 (36)
Full owner operator- landlord	1,386 (14)	2,710 (13)	283 (13)	1,365* (10)	2,553 (14)	3,797 (11)	2,091 (10)	824 (9)
Part-owner operators	6,240 (34)	15,210 (30)	2,070 (25)	2,895 (26)	5,041 (31)	5,289 (31)	3,156 (21)	2,962 (26)
Total land owning population	3,342 (138)	7,359* (102)	1,094 (108)	1,773 (79)	5,031 (149)	4,299 (100)	2,465 (96)	2,681 (76)

* Significant difference in paired means at 95% confidence level.

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

in 1975 while those who had not averaged 12.5 days a month. It is consistent that those farmers who had expanded their land base and had larger operations both in terms of acres and gross income would have had less time to work off the farm than the other group (Table 14).

Other Characteristics

Per capita income in 1974, age and education were not significantly different between the two groups of farmers.

III. EXPANSION OF THE LAND RESOURCE THROUGH RENTING

Twenty-nine percent of all farmers in the region in 1975 rented in either part or all of their land resource. Only 13 percent of these were tenants renting in all the land they operated. The rest owned part and rented in part. About 73 percent of all the acreages "rented in" were 50 acres or less (Appendix Table 33). Seventy-six percent of those renting rented in a single parcel while 20 percent rented in two separate parcels and 8 percent rented in three or more (Appendix Table 34).

Of those farmers who owned part and rented in part, 46 percent of the rented parcels were contiguous to the farmer's homestead, 20 percent were up to one mile removed, 14 percent were between one and two miles, and 15 percent of the parcels were greater than two miles removed (Appendix Table 35).

Cash payment and shares agreement were the most common manner in which farmers in the region paid for the land they rented. Fifty-eight percent of the rented parcels were paid by some form of shares agreement, 28 percent were paid in cash, 9 percent by some combination of

shares and cash payment, and 5 percent by some other means (Appendix Table 36).

Rented parcels in the region were used for a variety of different agricultural activities. Some parcels were used for a single activity while others were used for several. Forty percent of the parcels were used in part or exclusively for pasture. Of those reporting pasture as a use, the acreage devoted to that use ranged from 1 to 155 acres and averaged 48 acres. Fifty-one percent of the rented parcels were used for crops. Acreage devoted to crops ranged from 1 to 94 acres and averaged 15 acres. Forty-nine percent of the parcels were used for tobacco production with the acreage ranging from one to six acres and averaging two acres. Finally, 26 percent of the parcels were used exclusively or in part for other activities which included vegetable gardens and timber among others. The acreage devoted to this miscellaneous category averaged 16 acres and ranged from 3 to 97 acres (Appendix Table 37).

Renting in land appears to be an important way in which some farmers in the region augment their land resource. Thirty-nine percent of those farmers renting in land rented in more land than they owned in 1975. Fifty-nine percent owned more than they rented and 2 percent owned and rented the same amount.

IV. A GLIMPSE AT FRAGMENTATION OF FARMS IN UPPER EAST TENNESSEE

Land is physically limited in any given area. It follows, therefore, that the expansion of a farm's acreage involves the contraction of someone else's acreage. In Upper East Tennessee the total amount of

inventory acreage, that land in agricultural use, declined between 1958 and 1967. The census also reports a decline in "land in farms" between the years of 1960 and 1970. Despite the reported decline in the total amount of farmland, the average farm in the region has increased slightly in size. One can infer from the preceding that along with farms that are expanding, there are those that are being sold and split up. As a matter of fact, it is not at all unlikely that part of the increase in average farm size results from the relatively rapid disappearance of small sized farms.

The survey results provide a partial picture of fragmentation of farms in the region. Included in this analysis will be an examination of farmers in the region who have sold part of their holdings and a brief look at those who rented out land in 1975. Both of these activities represent a fragmenting of a farmer's land resource, one through the legal transfer of title and the other through the temporary relinquishing of one's exclusive rights to land. What limits the analysis is the lack of information about the transfer of whole farms. We cannot answer the question about the extent to which whole farms when transferred by sale or gift were maintained, enlarged, or split up. This shortcoming is due to the design of the study. Individuals who had sold their farms or who had dropped out of farming were not part of the sample.

Transfer of Part of a Farm

About 18 percent of farmers in Upper East Tennessee indicated that at one time or another they had transferred part of their farms to other individuals. The average size of these parcels was about 30 acres. The

manner in which they were transferred was through either sale or gift. Fifty-five percent of the parcels were sold to nonrelatives, 28 percent were sold to relatives, 15 percent were transferred in the form of a gift and 1.5 percent were transferred under other conditions. Those parcels which were sold to nonrelatives averaged 38 acres while those sold to relatives averaged 28 acres. Parcels transferred as gifts averaged only 7 acres.

Of those parcels sold, 17 percent were sold in the 1950's averaging 16 acres in size and \$197 in price per acre. Forty-one percent were sold in the 1960's; these averaged 52 acres in size and \$667 in price per acre. Forty-one percent were sold in the 1970's; these averaged 29 acres in size and \$804 in price per acre (Appendix Table 38). Comparing the price per acre of parcels sold with the price per acre of those purchased by farmers during the same time periods, we find that on the average in both the 1960's and the 1970's the sale price was greater than the purchase price. This was due in part to the disproportionate number of small parcels sold. Fifty-nine percent of those parcels sold were 20 acres or less while only 43 percent of parcels purchased were that small (Appendix Table 39).

Comparing the subpopulations of farmers who have sold part of their farm and those who have not, we find several significant differences. The average acreage held by those who had sold part of their farm was 85 acres while the acreage of those who had not was significantly smaller, 54 acres. Farmers who had sold part were also significantly older in age, 58 years compared with 48 years. And finally, farmers who had sold part of their farms worked fewer days off the farm, 8.5 days per month compared

with 11.7 days for those who had not. There was no significant difference between these groups with respect to the amount of land rented, education, family size, off-farm income, gross and net farm income in 1974, and per capita household income in 1974 (Table 15).

Farmers Who Rented Out Land

In Chapter III we discussed the tenure category of full-owner operator-landlords, those farmers who rent out part of their land to be used by other farmers or individuals. These farmers were generally older than those of other tenure groups in the region, averaging 61 years of age. This group represented only 10 percent of the farm population in 1975.

On the average this group rented out 26 acres in 1975. The size of such parcels ranged from 1 to 400 acres. Sixty-seven percent of them were 10 acres or less, 27 percent were between 20 and 50 acres, and only 7 percent were more than 50 acres (Appendix Table 40). Compared with those farmers who rent in land, this group rents out a disproportionate number of small parcels.

Twenty-three percent of those parcels rented out were paid for with a cash payment ranging from \$10 to \$1,500 per acre per year. The higher rents corresponded with the smaller parcels. Seventy-three percent of rented out parcels were done so on a shares basis. A 50 percent split on the value of production was the most common arrangement (Appendix Table 41).

Rented out parcels were used in a variety of ways not unlike rented in parcels. Sixty-two percent of rented out parcels were used

TABLE 15

CHARACTERISTICS OF FARMERS WHO HAVE SOLD LAND AND THOSE WHO HAVE NOT,
UPPER EAST TENNESSEE

	Land* owned (acres)	Land rented (acres)	Age*	Educa- tion (yrs)	Family size	Off- farm income (\$/yr.)	Gross farm income 1974 (\$/yr.)	Net farm income 1974 (\$/yr.)	Days* worked off- farm per month 1974	Per- capita house- hold income (\$/yr.)
Farmers who have sold land	84.8 (49)	19.3 (49)	58.2 (50)	8.9 (50)	3.0 (50)	3779 (47)	5098 (48)	1436 (38)	8.5 (50)	2249 (35)
Farmers who have not sold land	54.1 (233)	17.8 (233)	48.1 (232)	9.5 (231)	3.4 (234)	4860 (213)	4918 (200)	1363 (154)	11.7 (233)	2561 (142)

*Significant difference in paired means at 95% level.

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

exclusively or in part for the production of burley tobacco. The acreage devoted to this use averaged 2.0 acres and ranged from one to five acres. Thirty-nine percent of the parcels were used exclusively or in part for crop production. Acreage devoted to this use averaged 8.2 acres and ranged from 2 to 33 acres. Fifteen percent were used exclusively or in part for pasture. Acreage devoted to this use averaged 80 acres with a range from 9 to 350 acres. Twenty-three percent reported other uses and combination of uses, with an average acreage of 8.2 acres and a range from 1 to 25 acres (Appendix Table 42).

By far the greatest proportion of full-owner operator-landlords rented out small fractions of their total holdings. Seventy-two percent rented out less than 50 percent of the land they owned, an average of 12.8 acres. Twenty-eight percent rented out more than 50 percent of their holdings, an average of 73 acres per parcel.

V. TRANSFER PLANS OF FARMERS IN THE REGION

The farm population in Upper East Tennessee has been quite stable over time. Eighty-nine percent of farmers surveyed in the region were born in the 12-county area. Further, 62 percent reported only one residence during their lifetimes. When farmers were asked if they expected to move in the next year or two, 93 percent replied that they did not, 5.2 percent replied that they did, and 1.4 percent "didn't know."

Asked about longer range plans for their farms, 70 percent of the farm population wanted some member of the family to continue the operation when the present operator was no longer able. Of these, 60 percent thought that the only way to maintain the farm in the future

was on a part-time basis while 40 percent thought a family member could make a living as a full-time farmer.

Those who were interested in the continuity of family ownership cited several reasons. The most frequently mentioned was a desire to keep the farm as a unit and within the family (28 percent). Twenty-four percent thought that it was a good idea only if there was some outside source of income, that the farm by itself was not large enough to generate an adequate income. Some expressed the feeling that farming was a "good," "healthy" way of life that they hoped their children would adopt (14 percent). Others were hopeful but uncertain about the wishes of their children. Eighteen percent expressed a variety of other reasons.

Twenty-one percent of the farmers in the region did not want the farm maintained within the family. Forty-seven percent of these respondents expressed a pessimistic outlook for farming; they felt that it was "too hard a life" or that the farm was "too small." Twenty-two percent indicated that no one in the family seems to like farming and 18 percent have no relatives or only daughters.

Although the question of how farmers will convey ownership to family members is not answered in this study, there is strong evidence that farms will be passed on in one way or another to the next generation. There is also the strong feeling within the farm population that the future viability of a farm business will be dependent on off-farm opportunities and income.

VI. SUMMARY

The important findings of this chapter are:

1. Forty percent of the farm population in the region have expanded

their land resource through the purchase or inheritance of additional land. Compared with those farmers who have not expanded their land base, this group had significantly larger landholdings in 1975, larger gross and net farm incomes in 1974, and worked fewer days off the farm in 1975.

2. The average size of the first acquisition of land has declined in size with each passing decade from 68 acres in the 1930's to 26 acres in the 1970's.

3. Price of land has risen steadily with each passing decade since the 1930's. Average per acre price of farmland purchased in the 1970's was \$718.

4. Nineteen percent of first acquisitions in the region were inherited while only 12 percent of additional parcels were inherited. Inheritance of the first parcel does not appear to have helped appreciably farmers who have expanded. For those who have not expanded, inheritance of the first parcel has given the farmer some advantage in terms of size in acres.

5. The most important sources of farm real estate financing has been commercial banks, the seller, and cash payments. Traditional farm lending institutions (FHA, PCA, and Federal Land Bank) have not reached many farmers in the region.

6. Twenty-nine percent of all farmers in the region rented in either part or all of their land resource. Those renting in part of their land, rented on the average 55 acres while those renting in all of their land rented an average of 129 acres. Forty percent of the part-owners rented in more land than they owned in 1975.

7. Eighteen percent of the farmers in the region indicated that

they had sold part of their farms. This group had significantly larger tracts of land and were older. The average size of these parcels was 30 acres.

8. Ten percent of the farm population rented out land in 1975. The average size of these parcels was 26 acres.

9. There is strong evidence that farmers in the region would like to pass their farms on, in one way or another, to their offspring. There is also a strong feeling that the future viability of farms in the region will depend on off-farm opportunities and income.

CHAPTER V

THE EFFECT OF LOCATION ON FARMLAND CONSOLIDATION, FRAGMENTATION AND FARM REAL ESTATE VALUE

The previous two chapters have dealt with the general characteristics of farmland tenure as well as the processes of consolidation and fragmentation in the Upper East Tennessee region. To generalize about the entire region is to ignore the many differences that exist within it. Through the use of cross sectional data, Chapter II documented county by county differences that are apparent in the region with respect to land use. One important finding was the strong correlation between 1) the percent of urban and built-up area and population density in a county and 2) the average per acre value of farmland in that county. These intuitively obvious relationships raise the question of how urbanizing loci in the region have affected the processes of farmland consolidation and fragmentation of which we have spoken before.

I. UNDERLYING CONCEPTS

There is no dearth of literature on the effect of location on land value. It has consistently been considered an important determinant of land value. Von Thunen in the early 1800's developed one of the first analyses of the "effect transportation facilities and location with respect to markets can have upon utilization: (2, p. 351). Implicit in this model are nodal centers or concentrations of demand to which an area relates through transportation media. According to Von Thunen, the

value of land is determined by its spatial relationship to some market and the extent to which the "friction of space" has been reduced or minimized (2, p. 268).

Ricardian rent theory looks at land value from a somewhat different perspective. In Ricardo's "world," "the most important fertile lands are brought into cultivation and no payment of rent would be associated with their use. Rent arose on these lands only when increases in population numbers and in the demand for land (italics mine) make it necessary for society to bring less fertile lands into use." "Population increases," like population densities, are closely related to the process of urban growth. So we can say that Ricardo sees the value of land attributable to population pressure principally through the increase of demand for food and differences in land fertility as well as increased demand for space. As the population grows, the demand for food and space increases similarly which makes it necessary for less fertile lands to be brought into production. Since the price of a commodity, according to Ricardo, is determined by the production costs associated with the highest-cost portion of the total supply needed by society (2, p. 5) a rent accrues to the owners of the more centrally located and fertile areas, those lands which produce more easily. Although not specifically set forth, Ricardian rent theory gives us a sense of a centrally located core of population which effects the surrounding area by its demand for food production and space.

In accordance with the theory of "highest and best use," Boddington in an English study concluded that:

The chief attribute of urban land is its situation in relation to other urban centers and the transport network. Land that is worth

\$100 and \$1000 per acre in agricultural use may be valued at \$10,000 and \$45,000 per acre for urban purposes. . . (3, p. 39).

We find again that the influence of urbanizing factors bids land prices up and is likely to shift land use from one activity to a more productive activity in an economic sense.

II. THE CLASSIFICATION OF SAMPLE AREAS ACCORDING TO LOCATION

As indicated in Chapter II, the population density and population growth of Upper East Tennessee is greater than that for the state. There are numerous concentrations of people throughout the region in towns and cities. The largest towns are Kingsport, Johnson City, Morristown, Bristol, Elizabethton and Greeneville. There are several towns of a lesser size including Newport, Jefferson City, Erwin, Rogersville, Hampton, Blountville, Tusculum, Jonesboro, Rutledge, and Dandridge. These centers are dispersed fairly equally across the region. There is, however, a greater concentration of people in the valley between the Bays and Unaka ranges, especially toward the northeast extreme of the region. Two counties, Hancock and Johnson, are conspicuously isolated geographically without any major population centers.

Forty areas were randomly selected from the 12-county region. In each of the sampled areas, an effort was made to contact each farmer residing in that area. In a particular area, then, all farmers were more or less similarly situated in space. The distance between the middle of the sampled area and the nearest population center was then measured along the most direct route. A weighting procedure was used to account for differences in the population of the different urban areas.

For example, one area in Hancock County was two miles from Sneedville with a population of less than 1000 in 1970. This area was scored with a four (Table 16). An area in Washington County was three miles from Jonesboro and five miles from Johnson City. The population pressure from both centers was summed. This area was scored with a 20. After all forty areas were similarly scored they were arrayed according to their score from lowest to highest and then divided into three groups. The groups with the highest scores were those areas allegedly experiencing the greatest population pressure. The groups with the lowest scores were those experiencing the least population pressure.

Other factors such as location to TVA lakes, large highways and Interstates 81 and 40, and proximity to Knoxville were considered but were finally precluded from analysis for lack of an adequate way of measuring their respective influence.

III. THE EFFECT OF LOCATION ON THE PROCESS OF CONSOLIDATION

Has the location of a farm in the region had an effect on its concolidation over time? Although the evidence is limited by the paucity of observations in different time periods, it is apparent in the 1960's that a pattern emerged. The price per acre of land purchased nearest urban areas averaged \$747 per acre and was significantly more expensive than land purchased in the most remote areas which averaged \$364 per acre (Table 17). As one would expect, the sizes of purchased parcels acquired during that decade were smaller in urban areas than in the remote ones. On the average, first acquisitions in urban areas were 30 acres and current holdings 33 acres. This indicates only a slight expansion. In

TABLE 16

WEIGHT FACTORS USED IN CLASSIFYING THE LOCATION OF SAMPLE AREAS

Distance of sample area from urban center in miles	Size of population of nearest urban center			
	0-999 (persons)	1000-9999 (persons)	10,000-29,999 (persons)	Over 30,000 (persons)
Adjacent	5	10	15	20
1 - 4.9 miles	4	8	12	16
5.0 - 9.9 miles	3	6	9	12
10.0 - 14.9 miles	2	4	6	8
15.0 miles and over	1	2	3	4
Population centers in the region	Dandridge Rutledge Sneedville	Blountville Erwin Hampton Jefferson City Mt. City Newport Jonesboro Rogersville Tusculum	Bristol Elizabethton Greeneville Morristown	Johnson City Kingsport

TABLE 17

THE HISTORICAL EFFECT OF LOCATION ON PRICE PAID PER ACRE ON THE
FIRST ACQUISITION, SIZE OF THE FIRST ACQUISITION AND
CURRENT SIZE OF LAND RESOURCE, FARMERS IN
UPPER EAST TENNESSEE

	Location		
	Urban	Middle	Remote
Average Price Paid for First Parcel (\$/acre) Acquired in:			
1930 or earlier	--	\$ 57.00 (2)	\$ 66.00 (3)
1931-1940	\$ 36.00 (2)	77.80 (4)	186.00 (5)
1941-1950	141.80 (8)	129.70 (10)	145.30 (16)
1951-1960	334.38 (13)	211.06 (17)	365.10 (16)
1961-1970	746.80 (22)	612.30 (15)	364.21 (19)
1971 or after	1100.00 (5)	600.00 (9)	688.28 (7)
Average Size of First Parcel (acres) Acquired in:			
1930 or earlier	51.3 (4)	31.5 (4)	102.5 (4)
1931-1940	28.3 (6)	110.5 (6)	66.0 (8)
1941-1950	59.3 (11)	84.4 (13)	50.3 (21)
1951-1960	45.7 (19)	36.9 (27)	34.9 (23)
1961-1970	30.2 (30)	25.3 (22)	43.7 (31)
1971 or after	20.6 (7)	20.4 (13)	36.1 (11)
Average Current Size of Farms Acquired in:			
1930 or earlier	72.3 (4)	134.4 (5)	155.8 (4)
1931-1940	66.0 (6)	176.5 (6)	88.9 (8)
1941-1950	92.0 (11)	129.1 (13)	100.0 (21)
1951-1960	47.8 (18)	59.5 (27)	50.6 (23)
1961-1970	33.4 (30)	37.8 (22)	55.8 (31)
1971 or later	20.6 (7)	20.6 (13)	39.4 (11)

Numbers in parentheses refer to the number of sample observations
in each category

Source: 1975 survey of farmers in Upper East Tennessee.

the remote areas, first acquisition averaged 44 acres and current holdings 56 acres, indicating a more dramatic expansion than in urban areas.

The 1970's showed a similar pattern of prices paid per acre and size of acquisition in the three different locations. But for lack of sufficient observation, one cannot conclude that significant differences in price per acre and size of acquisition occurred in the different locations.

There is no evidence of significant differences in either the size or price per acre of parcels purchased in the three different locations before the 1960's. Although the data are scanty, it is tempting to view this emerging pattern in the 1960's as a function of the rapid population growth and industrialization that began to occur in the forties and fifties and intensified thereafter.

The ability of farmers to consolidate their land base in the region appears to have been affected by a farm's location only after the sixties. Price per acre of land in the more remote areas was relatively cheaper and the size of parcels acquired were relatively larger. The general pattern of consolidating farms shows a greater concentration in the more remote locations. For example, 42 percent of farmers in the remote locations have expanded their land base to an average current size of 105 acres (Table 18). This compares with only 28 percent in the urban locations which have been able to expand to an average current size of 67 acres. It is interesting to note that there was little difference in the size of farms of those who did not expand, irrespective of location. The average current size of a farm so classified was 42 acres in the urban areas and 41 acres in the most remote areas, showing only a slight difference.

TABLE 18

SIZE OF CURRENT LAND HOLDINGS OF FARMERS WHO HAVE
EXPANDED AND THOSE WHO HAVE NOT, BY LOCATION,
FARMERS IN UPPER EAST TENNESSEE

Location	Farmers who have not expanded		Farmers who have expanded	
	Initial acquisition	Current landholding	Initial acquisition	Current land holding
Urban	44.1 ^a (58)	42.3 acres (57)	26.7 ^a acres (23)	66.6 acres (23)
Middle	47.3 (46)	45.2 ^a (46)	38.6 (43)	94.5 ^a (44)
Remote	46.1 (67)	40.9 ^a (67)	48.4 (41)	105.2 ^a (41)

^aSignificant difference at 96% level.

Numbers in parentheses refer to the number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

Location, then, has clearly affected the process of consolidation. The nearer a farm to an urbanizing area the more difficult it has been to expand the land resource especially in the last 15 years.

With respect to expansion through renting, the evidence does not point to any clear cut pattern. Part-owner operators, in numbers alone, are slightly more concentrated in the more remote areas. Thirty-eight percent of part-owner operators are in the more remote locations of the region. Thirty-two percent are in the middle locations and 30 percent are nearest the urban areas. The average size of parcels rented by these farmers is not significantly different from one location to another although there is a pattern of larger parcels rented in the more urban locations (Table 19). This makes intuitive sense. There is probably greater comparative advantage in renting farmland as compared with its purchase in those areas most affected by urban influence.

IV. THE EFFECT OF LOCATION ON THE PROCESS OF FARMLAND FRAGMENTATION

Location of a farm not only affects the process of farmland consolidation, but it also affects the fragmenting of farms. As stated earlier, the process of fragmentation is not fully documented in this study. We can, however, infer from data on the transfer of parts of farms over the last 25 years that location has had some effect on both the size and price of these parcels. Of those farmers closest to the urban areas who had likewise sold one or more parcels, the average size of those parcels sold was 6.0 acres at an average sale price of \$1241 per acre. Those parcels sold in the most remote areas of the region were significantly larger, averaging 54 acres and selling for an average of \$291 per acre (Appendix Table 43).

TABLE 19

LOCATION AND CHARACTERISTICS OF FARMERS, UPPER EAST TENNESSEE, 1975

Location	Average land owned 1975 (acres)	Average land rented 1975 (acres)	Age	Off-farm income 1975 (\$/year)	Days/month worked off-farm 1975	Net-farm income 1974 (\$/year)	Gross farm income 1974 (\$/year)	Per capita household income 1974 (\$/year)	Education (years)
Urban	44.7 (88)	23.0 (88)	49.6 (88)	5000.80 (84)	10.4 (90)	1023.70 (53)	6378.08 (73)	2682.80 (51)	10.5 (88)
Middle	65.7 (95)	18.3 (95)	49.8 (95)	4942.80 (88)	12.4 (95)	1259.18 (61)	4580.51 (81)	2477.91 (58)	9.0 (95)
Remote	66.6 (102)	13.1 (102)	50.4 (102)	4088.40 (91)	10.5 (101)	1692.27 (80)	4172.70 (96)	2560.00 (70)	8.9 (101)

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

In the more urban areas about 67 percent of all parcels sold were five acres or less--the largest being 25 acres. The preponderance of very small parcels leads one to believe that they were sold for purposes other than agriculture, perhaps for residential home sites or commercial establishments. Parcels sold in the more remote areas were larger ranging up to 228 acres. Only 29 percent of these parcels were five acres or less pointing out the likelihood that such parcels were used for expanding farms rather than residential and other purposes.

Twelve percent of the farmers have relinquished some control over part of their land by renting it out to other individuals in the region. There was no apparent pattern in the spatial distribution of these farmers (Appendix Table 44). A similar number were located near urban areas as in the most removed areas. The size of parcels rented out by farmers near the urban areas of the region averaged 10 acres compared with 18 acres for those rented out in the most remote areas.

V. LOCATION AND OTHER CHARACTERISTICS OF FARMERS

Except for significant differences in the size of land holdings, farmers in the region did not exhibit any significant differences in selected demographic and income characteristics (Table 19). There were no discernible differences in the location of a farm and the land rented by a farmer, the age of the operator, off-farm income, days worked off the farm, net farm income, gross farm income, and per capita household income. Only the education of farmers in the more remote areas was significantly less than that of farmers in closer proximity to urban areas.

VI. SUMMARY

The location of a farm in Upper East Tennessee has had an important influence on the ability of the operator to expand his land resources over time.

1. Distance from urban areas has had a significant effect on land values in the region after 1960.

2. Since land value or market price of land is the mechanism by which land is allocated among competing interests, it stands to reason that after 1960 location has been associated with the ability of a farmer to expand his land resources.

3. On the average, farms nearest urban areas were 45 acres in 1975. Those in middle and remote areas averaged 66 and 67 acres, respectively.

4. Those farms which expanded and were nearest urban areas averaged 67 acres. Those in middle and remote areas averaged 94 and 105 acres, respectively.

5. Those farms which have not expanded averaged 42 acres. Those in middle and remote areas averaged 45 and 41 acres, respectively. Location has little apparent effect on these farms.

6. The sale of parts of farms has occurred slightly more often among those farms closest to urban areas. The average size of these parcels was 6.9 acres with an average sale price of \$1241 per acre. In middle and more remote areas, the average size of these sold parcels was 42 and 54 acres for average prices of \$468 and \$291 per acre, respectively. The preponderance of small parcels sold in the urban areas points to the likelihood of its sale for residential siting rather than agriculture.

7. The renting of land either in or out does not show a very strong pattern in the region. Although not statistically significant, part-owner operators tended to rent in more land in the urban areas than in the more remote areas. One might hypothesize that renting in land in this area is a more efficient way in which to expand resources than through purchase of land. Also 64 percent of the tenant farmers rented their land in those areas nearest urban areas.

CHAPTER VI

CONCLUSIONS, POLICY IMPLICATIONS, AND SUGGESTED RESEARCH

I. CONCLUSIONS

There have been important changes in the way land has been used in Upper East Tennessee over the past 25 years. Many of these changes have been associated with relatively rapid non-farm growth, which has been concentrated in population centers dispersed over the region's 2.5 million acres. Growth in non-farm income and population have led to increased demand for land for residential as well as industrial and commercial purposes. These developments have helped to push farmland values in the region up by a factor of five since the 1940's, to an average of \$718 per acre in the 1970's. Accompanying this dramatic increase in price have been major shifts in land use. Acreage in agricultural use declined by 6.2 percent between 1958 and 1967, sharper than the 2.6 percent decline across the state. Urban and built-up areas, on the other hand, increased by 25 percent in the region compared with a more modest increase of 15.7 percent across the state between 1958 and 1967.

There is little doubt that population growth, increased population densities, substantial land areas diverted to urban uses and the mountainous terrain, have contributed to the pressure on farmland and have tended to bid up its value, especially after 1960. Since these factors have been of greater influence in the 12-county region than across the state, per acre farmland values in the region have generally been higher than in the Middle and Western regions of the state.

Despite the aforementioned pressures affecting the region, the farm population has shown remarkable resiliency. Between 1959 and 1969, the number of farmers in the region declined by 10 percent. This compared with a more severe decline of 23 percent across the state during the same time period. Average farm size has remained more or less static at about 60-65 acres over the past 25 years. In addition, there has been a relatively slow decline in the number of marginal Class 5 and 6 farms.

Some farmers in the region have attempted to adjust by consolidating their land base. Expansion of one's productive land base has traditionally been an important adjustment option open to the farmer who wants to increase his income. Farmers who have actually had the opportunity to expand their land base in the region (40 percent of the total), presently own significantly more land and generate significantly more net and gross farm income than their non-expansionary counterparts. The difference in the means of these variables for the two groups does not, however, seem to be very important. The group which had gone through a process of expansion owned on the average 93 acres while those who had not owned only 43 acres, less than half in 1975. But even 93 acres is substantially fewer than the state average of 124 acres in 1969. Similarly with gross farm sales, the non-expansion group averaged \$3,342 while the expansion group averaged more than twice that amount, \$7,359 in 1974. Neither of these figures is representative of large operations. Clearly, there was no great difference in net and gross farm income, between those who had consolidated and those who had not, at least in 1974.

Expansion of one's land base through renting is another traditional adjustment strategy farmers have used. The number of part-owner operators

in the region has increased in the last 15 years to 25 percent of the total farm population, but the number is still substantially below the proportion in the state and nation. By all 1974 income criteria, part-owner operators were better off than any other tenure group. This group controlled through ownership and renting an average of 121 acres, more than twice the average for all farmers in the region.

Although the phenomenon of expansion of one's land resources through either purchase or inheritance or annual lease has occurred in the region, the benefits of these strategies have been confounded by the most important adjustment strategy that has occurred--off-farm employment. Forty-nine percent of the farmers in the region worked full time off the farm in 1975, and in every tenure category, off-farm income was the most important source of income in that year. Income generated from farm activities was decidedly less and clearly supplementary.

Increasing one's control of farmland, therefore, has not been an important way of increasing farm income in Upper East Tennessee. Land had become less and less available. Prices have risen steadily and the size of new farms in terms of acres has declined with each passing decade. There is little reason to believe that consolidation of farmland in the region will be an attractive income adjustment alternative to very many farmers in the years to come.

II. POLICY IMPLICATIONS

Our vision of the future is a function of our past experiences. Based on the research embodied in this thesis, there are five important implications with respect to the use and status of farmland in Upper East Tennessee in years to come.

1. Public policy directed toward raising the income of the limited resource farmer in the region should not focus on the expansion of land resources as a possible adjustment strategy. Land is economically and physically in short supply. A more effective strategy for improving the incomes of the limited resource farmer might be some kind of vocational training program. By providing the individual with a salable skill, his chances for employment would be enhanced in the non-farm sector of the region which appears likely to continue its growth in the coming years.

2. The vitality of the farm sector is dependent on the ability of young individuals to gain access to farmland and other important farm inputs so that one can establish a profitable enterprise. Cross-sectional data in the study shows the possible existence of the "agricultural ladder" with tenants being the youngest tenure group in the region followed by part-owner operators, full-owner operators, and full-owner-operator landlords. Existence of this "ladder" is no doubt dependent on off-farm opportunities which provide supplemental income needed to facilitate the purchase and improvement of farm property. Despite these apparent favorable conditions for new entrants, the most recent acquisitions of farms in the region are extremely small in size, averaging less than 30 acres. These new "farmers" would perhaps be better termed "hobbyists."

3. The intervention of the government in land use planning at one level or another will probably become more imminent as population presses more and more on the region's land. Assuming the return per acre on tobacco, livestock and other agricultural products typical of

the area do not increase dramatically, some control on rising land values would help to make full-time farming profitable in the region, especially for new entrants and those farmers who want to expand their land base to achieve economies of scale. As it stands now, in most areas of the region the purchase of farmland for the exclusive purpose of agricultural production would be a rather poor investment because of high land prices.

If farming as a way of life and livelihood is to be protected in the region, the state government must use its sovereign powers in future years to help minimize the debilitating and discouraging effects of high land values, expensive machinery, high energy costs and increasingly scarce credit. Otherwise, the free market will more than likely alter the agricultural character of the region.

With respect to rising land values, there are a number of examples of what government intervention can do. In Saskatchewan, Canada, for example, the government has used its proprietary powers to buy up large tracts of land (500,000 acres) at market value and then lease out parcels to individuals who have a legitimate interest in farming. After five years, the individual is provided the opportunity to buy the land.

Another example of an effort to constrain rising land values and resulting shifts in land use are the agricultural districts that are proliferating in the state of New York. Farmers and landowners along with local and state government are able to "zone" an area if those who reside within the district agree to commit their land to farming for eight years. As a result, the land is assessed on its use value instead of its market value. If the commitment is broken, large penalties are

incurred. These districts have helped diffuse the speculative pressure on farmland which, when unchecked, tends to undermine efforts in an area to invest in farming.

Whatever the approach taken in Upper East Tennessee to avoid shifts of land out of agriculture, a grass roots commitment to that approach will be needed to assure success. Conflicting interests are naturally inherent within the farm population. Older farmers who are looking toward retirement are hoping for continual inflation in land prices. Part-time farmers are similarly interested in inflationary pressure since they are not completely dependent on farm income. New entrants and younger full-time farmers are interested in lower land prices so that they can make a profitable investment. These conflicts must be resolved in order to assure a successful rural land-use policy.

4. The urban areas in Upper East Tennessee will probably continue to sprawl on the better lands. Evidence from the research shows that there is a high correlation between the percent of a county in urban and built-up areas and the percent of a county in class I-III soils. The benefits and costs of the continuing loss of prime agricultural land to urban uses must be evaluated. In our haste to develop on these prime lands, we might needlessly jeopardize the welfare of future generations or even ourselves 30 years hence.

5. The unique character of the 12-county region with respect to its farmland resource as detailed in this study, points to the importance of similar studies in other regions of the state. Land-use planning in rural areas will probably become more popular across the state as population densities increase. It is incumbent upon policy makers and planners

at all levels of governments that they know the unique character of the rural land in a particular region and those who own and use it so that land use decisions can be more informed.

III. SUGGESTED RESEARCH

There are four important areas of study that would complement the research in this thesis.

1. The analysis of farmers' attitudes toward land use and the prospects of government interventions to control or guide land use decisions. It has been suggested that rising land values are likely to benefit some farmers while imposing constraints on others. Where does the majority sentiment lie on this issue in Upper East Tennessee? How many farmers are interested in preserving the agricultural character of the region? And how many are interested in hastening non-farm development?

2. The analysis of farms that are sold to non-farm interests. The focus of this thesis has been on the farmer and his land resources in Upper East Tennessee. Since large numbers of acres in the region have shifted out of agricultural use in recent years, it is important to assess the manner in which this land is presently being held and used. Land auction companies might be a source for exploring this issue in greater detail.

3. In the context of Upper East Tennessee, what are characteristics of a viable farm? If policies were designed to halt the shift in land out of agriculture, it would be necessary to know what constitutes a viable operation in the region. What are the kinds of farms with respect

to size in acre and mix of productive activities that would most likely survive in Upper East Tennessee? How many of these viable farms could resources in the region support? How important are land values to the viability of a farm? What do speculative land prices do to a farm community?

4. The relationship between the persistence of small marginal farms in the region and the burley tobacco program. In Chapter II it was indicated that burley tobacco was produced by 83 percent of the region's farmers in 1969. The average land area devoted to this production was .92 acres. Given the labor intensive character of this crop and the small poundage allotments, to what extent does the tobacco program contribute to the persistence of small marginal farms in the region? What would happen to farmers in the region if the government program was lifted?

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APPENDIX

TABLE 20

DRY CROPLAND ACRES BY LAND CAPABILITY FOR UPPER EAST TENNESSEE, 1967

Land Capability Class	Cropland in Tillage Rotation									
	Field Crops			Rotation Hay and Pasture, Hayland and Conservation Use		Tempo- rary Idle Land		Total Tillage Rota- tion		Orchards, Vineyards and Bush Fruit
	All Row Crops	Close Grown	Total Field Crops							
1	30,192	6,441	36,633	39,538	5,622	81,793	0	5,817	87,610	
2E	9,373	2,731	12,104	16,579	1,841	30,520	83	2,741	33,344	
3E	30,375	18,362	43,737	66,095	3,761	118,593	600	5,781	124,974	
4E	16,652	6,048	22,700	56,766	2,448	81,914	744	3,482	86,140	
6E	6,907	2,427	9,334	31,065	3,152	43,551	370	3,143	47,064	
7E	1,796	0	1,796	3,262	675	5,733	0	7,391	13,052	
3W	1,126	0	1,126	4,367	598	6,091	0	383	6,474	
4W	207	216	423	108	216	747	0	0	747	
2S	1,558	0	1,558	1,128	204	2,890	0	413	3,303	
3S	1,263	53	1,316	1,417	651	3,384	0	0	3,384	
4S	3,127	0	3,127	5,211	1,030	9,368	25	1,295	10,688	
6S	1,441	0	1,441	10,779	634	12,854	75	1,865	14,794	
7S	777	0	777	13,197	344	14,318	0	3,100	17,418	
	104,794	36,278	141,072	249,508	21,176	411,756	1,897	35,339	448,992	

Source: Tennessee Soil and Water Conservation Needs Inventory, 1967.

TABLE 21

DRY PASTURE, FOREST AND OTHER LAND BY LAND CAPABILITY CLASSES FOR UPPER EAST TENNESSEE, 1967

Land Capability Class	Pasture	Forest			Other Land			Total Land in Inventory	
		Commercial	Non- Commercial	Total	Total Grazed	In			
						Farms	Not in Farms		
1	55,376	18,606	0	18,606	4,747	9,228	4,634	13,862	175,454
2E	12,692	4,589	0	4,589	1,634	3,908	2,535	6,443	57,068
3E	93,339	48,640	0	48,640	11,605	17,632	6,061	23,693	290,646
4E	105,802	81,867	150	82,017	20,110	12,970	7,166	20,136	294,095
6E	112,463	149,737	100	149,837	41,648	6,778	6,780	13,558	322,922
7E	53,957	286,614	250	286,864	40,496	4,038	539	4,577	358,450
2W	85	0	0	0	0	0	150	150	235
3W	6,942	2,667	0	2,667	329	826	1,201	2,027	18,110
4W	1,362	1,439	0	1,439	547	99	0	99	3,647
2S	1,243	2,582	0	2,582	102	116	694	810	7,938
3S	1,257	2,770	0	2,770	290	314	600	914	8,325
4S	3,728	12,071	100	12,171	1,265	1,751	0	1,751	28,338
6S	26,903	86,974	400	87,374	18,266	3,520	1,957	5,477	134,548
7S	20,275	302,081	400	302,481	19,514	3,946	860	4,806	344,980
Total	495,424	1,000,637	1,400	1,002,037	160,553	65,126	33,177	98,303	2,044,756

Source: Tennessee Soil and Water Conservation Needs Inventory, 1967.

TABLE 22

DRY CROPLAND ACRES BY LAND CAPABILITY CLASSES FOR TENNESSEE, 1967

Land Capability Class Subclass	Cropland in Tillage Rotation				Orchards Vineyards and Bush Fruit		Open Land Formerly Cropped		Total Cropland
	All Row Crops	Close Grown Crops	Total Field Crops	Conser- vation Use Only	Temporar- ily Idle Cropland	Total Tillage Rotation			
				Hayland	Pasture	Hay and Rotation			
1	510,824	52,633	563,457	27,309	160,458	1,015,592	517	51,100	1,067,209
2E	642,365	115,346	757,711	120,459	297,954	1,476,382	4,028	89,735	1,570,145
3E	376,707	89,714	466,421	138,931	255,981	1,092,911	2,986	90,328	1,186,225
4E	193,586	44,146	237,732	94,985	176,656	650,746	3,096	77,580	731,422
6E	100,638	12,275	112,913	65,683	149,336	451,165	1,593	68,401	521,159
7E	15,479	1,813	17,292	12,691	42,355	111,536	114	42,351	154,001
2W	426,761	13,542	440,303	18,689	26,395	585,817	217	22,017	608,051
3W	277,406	14,733	292,139	23,831	44,626	452,910	0	21,316	474,226
4W	91,111	5,425	96,536	3,286	11,114	134,218	0	5,317	139,535
7W	0	0	0	0	0	242	0	0	242
2S	24,668	4,652	29,320	17,086	19,654	95,482	0	13,153	108,635
3S	7,864	780	8,644	770	2,289	14,519	50	670	15,239
4S	18,055	2,276	20,331	8,990	18,646	64,717	233	16,157	81,107
6S	11,414	3,530	14,944	13,409	44,064	97,216	75	19,152	116,443
7S	7,524	2,793	10,317	17,060	148,489	205,688	514	28,883	235,085
Total	2,704,402	363,658	3,068,060	1,398,017	612,779	6,449,141	13,423	546,160	7,008,724

Source: Tennessee Soil and Water Conservation Needs Inventory, 1967.

TABLE 23

DRY PASTURE, FOREST AND OTHER LAND BY LAND CAPABILITY CLASSES FOR TENNESSEE, 1967

Land Capability Class Subclass	Forest				Other Land		Total Land in Inventory	
	Total Pasture	Commercial	Noncom- mercial	Total Grazed	In Farms	Not in Farms		
1	347,143	336,354	1,200	337,554	76,091	29,896	105,993	1,857,899
2E	448,899	531,654	100	531,754	100,981	39,903	140,884	2,691,682
3E	609,410	1,423,253	1,200	1,424,453	93,009	62,863	155,872	3,375,960
4E	539,173	951,379	711	952,090	66,076	38,284	104,360	2,327,045
6E	568,399	1,350,004	1,575	1,351,579	48,822	37,097	85,919	2,527,056
7E	222,215	1,528,119	2,200	1,530,319	44,868	21,897	66,765	1,973,300
2W	83,259	185,983	500	186,483	34,462	7,534	41,996	919,789
3W	112,252	567,191	0	567,191	17,408	9,132	26,540	1,180,209
4W	39,739	78,114	0	78,114	4,226	1,976	6,202	263,590
7W	221	37,538	0	37,538	0	0	0	38,001
2S	64,596	154,289	0	154,289	11,123	4,539	15,662	343,182
3S	6,034	23,192	0	23,192	1,367	2,711	4,078	48,543
4S	33,890	268,575	100	268,675	7,904	3,190	11,094	394,766
6S	167,844	496,114	750	496,864	32,711	11,611	34,322	815,473
7S	221,417	4,264,916	1,575	4,266,491	46,345	29,674	76,019	4,799,012
Total	3,464,491	12,196,675	9,911	12,206,586	575,399	300,307	875,706	23,555,507

Source: Tennessee Soil and Water Conservation Needs Inventory, 1967.

TABLE 24

TENURE AND OFF-FARM INCOME, FARMERS IN UPPER EAST TENNESSEE, 1975

Tenure Classification	% and No. with Av. Mon. off-farm income-1975							Mean monthly Off-farm Income	Mean annual Off-farm Income
	\$1-99	\$100- 249	\$250- 499	\$500- 749	\$750- 999	Over \$1000			
Full-owner operator	2.2% (2)	3.3% (3)	24.2% (22)	38.5% (35)	20.9% (19)	11.0% (10)		\$402.50 (145)	\$4830.60 (145)
Full-owner operator- landlord	--	--	36.4 (4)	36.4 (4)	27.3 (3)	--		258.40 (25)	3100.80 (25)
Tenant	--	--	20.0 (1)	40.0 (2)	40.0 (2)	--		345.60 (10)	4147.20 (10)
Part-owner operator	--	--	20.6 (7)	32.4 (11)	20.6 (7)	26.5 (7)		430.44 (62)	5165.28 (62)
Total population	1.4 (2)	2.1 (3)	24.1 (34)	36.9 (52)	22.0 (31)	13.5 (19)		\$392.42 (242)	4709.41 (242)

Numbers in parentheses refer to the numbers of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 25

TENURE AND NET FARM INCOME, FARMERS IN UPPER EAST TENNESSEE, 1974

Tenure classification	With annual net farm income of:					Mean Annual Net Farm Income
	Under \$1000	\$1001 2500	\$2501 5000	\$5001 10,000	Over \$10,000	
Full-owner operator	58.0% (58)	33.0% (33)	8.0% (8)	1.0% (1)	--	\$996.55 (100)
Full-owner operator-landlord	65.2 (15)	30.4 (7)	4.3 (1)	--	--	753.26 (23)
Tenants	50.0 (3)	16.7 (1)	33.3 (2)	--	--	1316.67 (6)
Part-owner operators	35.3 (18)	27.5 (14)	23.5 (12)	11.8 (6)	2.0 (1)	2490.57 (51)
Total population	52.2 (94)	30.6 (55)	12.8 (23)	3.9 (7)	.6 (1)	\$1402.29 (180)

Numbers in parentheses refer to the number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 26

TENURE AND GROSS FARM INCOME, FARMERS IN UPPER EAST TENNESSEE, 1974

Tenure Classification	With Annual Gross Farm Income of:						Mean Annual Gross Farm Income
	Under \$2500	\$2501- 5000	\$5001- 10,000	\$10,000- 20,000	\$20,001- 40,000	Over 40,000	
Full-owner operator	62.7% (84)	21.6% (29)	11.9% (16)	2.2% (3)	1.5% (2)	--	\$3403.53 (134)
Full-owner operator-landlord	77.8 (21)	18.5 (5)	--	3.7 (1)	--	--	2023.70 (27)
Tenant	50.0 (4)	25.0 (2)	25.0 (2)	--	--	--	2952.50 (8)
Part-owner operator	29.7 (19)	25.0 (16)	23.4 (15)	14.1 (9)	3.1 (2)	4.7 (3)	10444.39 (64)
Total population	54.9 (128)	22.3 (52)	14.2 (33)	5.6 (13)	1.7 (4)	1.3 (3)	\$5284.88

Numbers in parentheses refer to the number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 27

TENURE BY ANNUAL PER CAPITA INCOME, FARMERS IN UPPER EAST TENNESSEE, 1974

Tenure classification	With Per Capita Income of:						Mean Annual Per capita income
	Under \$1000	\$1001- 2500	\$2501- 5000	\$5001- 7500	\$7501- 10,000	Over 10,000	
Full-owner operator	22.6% (21)	33.3% (31)	34.4% (32)	3.2 (3)	3.2 (3)	3.2 (3)	\$2642.72 (93)
Full-owner operator-landlord	52.6 (10)	26.3 (5)	21.1 (4)	--	--	--	1491.01 (19)
Tenant	50.0 (3)	16.7 (1)	16.7 (1)	16.7 (1)			2051.16 (6)
Part-owner operator	19.1 (9)	21.3 (10)	40.4 (19)	12.8 (6)	4.3 (2)	2.1 (1)	3048.65 (47)
Total population	26.1 (43)	28.5 (47)	33.9 (56)	6.1 (10)	3.0 (5)	2.4 (4)	2604.21 (165)

Numbers in parentheses refer to the number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 28

METHOD OF ACQUIRING FIRST AND SUBSEQUENT PARCELS
AND REAL ESTATE INDEBTEDNESS,
UPPER EAST TENNESSEE

	First Acquisitions %	Subsequent Acquisitions %
Purchased	77.0	86.6
Inherited	19.0	12.0
Other	3.4	1.3

Source of Financing of
purchased parcels

Federal Land Bank	8.3% (15)	8.2% (9)
Farmers Home Admin.	5.5 (10)	2.7 (3)
Commercial Bank	37.2 (67)	27.3 (30)
Seller	18.3 (33)	17.2 (19)
Cash	24.4 (44)	37.3 (41)
PCA	3.3 (6)	3.6 (4)
Other	2.7 (5)	3.6 (4)

Indebtedness in 1975

Debt Free	79.8%	85.0%
Mortgaged	20.2%	15.0%

Numbers in parantheses refer to the number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 29

NUMBER OF PARCELS ACQUIRED BY FARMERS, UPPER EAST TENNESSEE

No. of parcels acquired	No. of farmers	%
1	161	59.9
2	68	25.3
3	29	10.8
4	4	1.5
5	3	1.1
6	4	1.5

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 30

CHANGE OF RESIDENCE AND FARMLAND OWNERSHIP CHARACTERISTICS,
UPPER EAST TENNESSEE, 1975

Number of changes in residence	Average size of farm	% of region's farmland owned
0	64.7 acres	67.5% (177)
1	55.3	22.5 (69)
2 or more	46.1	10.0 (37)
All farms surveyed	60.0	100.0 (283)

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 31

YEAR, SIZE, AND PRICE OF FARMLAND PURCHASED IN UPPER EAST TENNESSEE

Date	Average Price		Average Total Acres		Average Cropland Acres	
	First Acquisition \$/acre	Subsequent Acquisition	First Acquisition	Subsequent Acquisition	First Acquisition	Subsequent Acquisition
1929 or earlier	149.50 (4)	-	61.8 (12)	-	29.8 (13)	-
1930-1939	66.40 (10)	-	68.1 (20)	-	38.6 (20)	-
1940-1949	152.28 (32)	115.75 (20)	62.4 (45)	13.9 (21)	36.0 (44)	7.8 (20)
1950-1959	222.26 (42)	290.50 (24)	38.7 (69)	60.7 (34)	24.2 (68)	24.2 (32)
1960-1969	592.18 (56)	359.55 (46)	34.0 (83)	35.8 (51)	19.6 (82)	16.6 (50)
1970 or later	672.53 (30)	739.95 (36)	26.0 (31)	27.6 (47)	14.1 (31)	17.6 (45)

Numbers in parentheses refer to number of sample observations in each category.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 32

LOCATION OF SUBSEQUENT ACQUISITIONS, FARMERS WHO HAVE EXPANDED
THEIR LAND BASE, UPPER EAST TENNESSEE

Distance from homestead	%	No. of subsequent parcels
Adjacent	73.6	(117)
	13.2	(21)
1.01 - 2 miles	3.8	(6)
2.01 - 3 miles	3.8	(6)
3.01 - 4 miles	1.9	(3)
4.01 - 5 miles	1.2	(2)
5.01	2.5	(4)
	Total	(159)

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 33

DISTRIBUTION OF RENTED LAND AMONG FARMERS,
UPPER EAST TENNESSEE, 1975

Size of total acreage rented in	No. of farmers renting in land	%
1-10 acres	35	40.2
10.1-50	29	33.3
50.1-100	10	11.5
100.1 or more	13	14.0
Average acreage rented in: 52.3 acres. Range in acreage: 1-400 acres.		

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 34

NUMBER OF DISTINCT PARCELS RENTED IN BY FARMERS,
UPPER EAST TENNESSEE, 1975

No. of parcels rented in per farmer	Number of farmers	%
1	74	75.5
2	17	17.3
3	5	5.1
4	1	1.0
5	1	1.0

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 35

LOCATION OF RENTED PARCELS RELATIVE TO FARMER'S HOMESTEAD,
UPPER EAST TENNESSEE, 1975

No. of miles	No. of parcels	%
Contiguous	42	46.2
Up to 1 mile	18	19.8
1.01-3 miles	13	14.3
2.01-3	6	6.6
3.01-4	4	4.4
4.01-5	3	3.3
More than 5 miles	5	5.5

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 36

MANNER OF PAYMENT FOR PARCELS RENTED IN, FARMERS IN
UPPER EAST TENNESSEE, 1975

Manner of payment	No. of parcels	%
Cash payment	34	28.3
Shares Agreement (1/3, 1/2, 2/3, 3/4)	60	50.0
Combination of shares and cash payment	11	9.2
Combination of shares; different percents on different activities	9	7.5
Mutual agreement; i.e. shared labor	2	1.7
Other	4	3.3

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 37

SIZE AND USE OF LAND RENTED IN BY FARMERS,
UPPER EAST TENNESSEE, 1975

Use	Average acreage devoted to use	Range in size of acreage	No. of parcels reporting use	% of total parcels (115) reporting use
Pasture	48.4 acres	1-155 acres	46	40.0
Crops	14.9	1-94	59	51.3
Tobacco	2.0	1-6	56	48.6
Other ¹	15.9	3-97	30	26.0

¹Woodland, rented house, vegetable garden, etc.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 38
AVERAGE PRICE PER ACRE OF LAND SOLD BY FARMERS,
UPPER EAST TENNESSEE

Years	Average size of parcel sold	Average price/acre
1949 or earlier	--	--
1950-1959	15.7 acres (8)	\$197 (7)
1960-1969	5.8 (19)	667 (14)
1970-or later	29.2 (19)	804 (16)

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 39
SIZE OF PARCELS SOLD BY FARMERS,
UPPER EAST TENNESSEE

Years	1-5 acres	6-20 acres	21-50 acres	51- acres	Total	%
1949 or earlier	-	-	-	-	-	-
1950-1959	2	2	4	-	8	(18.2)
1960-1969	8	1	2	7	18	(40.9)
1970-or later	9	4	1	4	18	(40.9)
	19 (43.2%)	7 (15.9%)	7 (15.9%)	11 (25.0%)	44 (100.0)	

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 40

SIZE OF PARCELS RENTED OUT, UPPER EAST TENNESSEE, 1975

Size of parcel rented out	No. of owner operator-landlord	%
1-10 acres	20	66.7
10.1-50	8	26.7
50.1-100	1	3.3
100.1- or more	1	3.3

Average size of rented out parcels: 25.4 acres.

Range in size: 1-400 acres.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 41

MANNER OF PAYMENT RECEIVED BY FARMERS RENTING OUT LAND,
UPPER EAST TENNESSEE, 1975

Manner of payment	No. of parcels	% of total
Cash payment	7	23.3
Shares agreement	22	73.3
1/3 value of production paid to landlord	8	26.7
1/2 value of production paid to landlord	14	46.7
Combination of shares and cash payment	1	3.3

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 42

USE AND SIZE OF LAND RENTED OUT BY FARMERS,
UPPER EAST TENNESSEE, 1975

Use	Average acreage devoted to use	Range in size of acreage	No. of parcels reporting use	% of total parcels (39) reporting use
Pasture	80.3 acres	9-350 acres	6	15.4
Crops	8.2	2-33	13	38.5
Tobacco	2.0	1-5	24	61.5
Other ¹	8.2	1-25	9	23.1

¹Woodland, rented house, vegetable garden, etc.

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 43

LOCATION AND SALE OF FARMLAND, UPPER EAST TENNESSEE

Location	Farmers reporting no sale percent	Farmers reporting sale of part of their farm percent	Average size of sold parcel acres	Average price per acre of sold parcel dollars
Urban	30.3 (71)	36.0 (18)	6.9	1240.87
Middle	35.9 (84)	20.0 (10)	42.3	468.44
Remote	33.8 (79)	44.0 (22)	54.1	290.67
	100.0 (234)	100.0 (50)		

Source: 1975 survey of farmers in Upper East Tennessee.

TABLE 44

LOCATION AND TENURE CLASSIFICATION, UPPER EAST TENNESSEE

Location	Tenure Group				Total
	Full-owner operator	Full-owner operator landlord	Tenants Percent	Part-owner operator	
Urban	28.2 (44)	40.6 (13)	63.6 (7)	30.3 (20)	31.7 (84)
Middle	65.9 (56)	18.8 (6)	18.2 (2)	31.8 (21)	32.1 (85)
Remote	58.3 (56)	40.6 (13)	18.2 (2)	37.9 (25)	36.2 (96)
	100.0 (156)	100.0 (32)	100.0 (11)	100.0 (66)	100.0 (265)

Source: 1975 survey of farmers in Upper East Tennessee.

VITA

William Thomas Coyle was born in Washington, D.C. on June 8, 1948. He grew up in Silver Spring, Maryland, a nearby suburb. After high school, he studied political science and Latin American studies at Williams College, Williamstown, Massachusetts. The second semester of his junior year was spent at the Universidad de los Andes, Bogota, Columbia. He returned to Williams the following year and graduated in June 1970. The fall of 1970 he joined the Peace Corps and spent two more years in Columbia. He was assigned to a small tropical island on the Pacific coast where he was involved in agricultural extension and credit supervision. After returning to the United States in December 1972, he was employed as an Alcoholism and Drug Abuse Counselor for two rural counties in West Virginia. He worked at this for a year and then in the fall of 1974, he began a graduate program in the Department of Agricultural Economics at the University of Tennessee, Knoxville. In December 1976 he received the master's degree in agricultural economics.

He is married to Jean Albright and is currently employed by the Manpower Development Division of Oak Ridge Associated Universities.